Antecedents and consequences of partners' helping behaviour in the context of pain: A motivational approach

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CHAPTER 1

GENERAL INTRODUCTION

Living together with someone in chronic pain can be very challenging, personally and relationally. In addition to dealing with the patient's psychological distress and physical limitations, partners must deal with altered roles and responsibilities. Without volitionally choosing for it, romantic partners are often challenged to provide adequate help on a daily basis. Help can be experienced as supportive, but sometimes also as not effective. Because of the repetitive nature of partners' caregiving role, partners can feel stressed about their day-to-day responsibility of being a supportive partner in combination with other valued activities. It is not surprising then that the motivation to provide help may show some variations, between persons, but also between days. After a hard day of work, helping may feel like a daunting duty, while on other days helping will give energy and enjoyment. To fully understand these motivational dynamics in partners, we need to introduce readers to the world of pain research, where pain is no longer considered as a private experience, but a social phenomenon. The critical role of interpersonal dynamics, such as partners' motives for providing help remains relatively understudied.

PART 1: AN INITIATION TO PAIN AND PAIN RESEARCH

Prevalence

The International Association for the Study of Pain (IASP) makes a distinction between acute and chronic pain. Acute pain is defined as pain that lasts for less than three months and is often characterized by clear physiological damage. Chronic pain is considered to persist beyond the expected time for normal healing (Task Force on Taxonomy of the Interantional Association for the Study of Pain, 1994). Prevalence numbers show that chronic pain is fairly common. For instance, a large scale survey in Europe revealed that chronic pain of moderate to severe intensity occurs

in one out of five adults (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). Moreover chronic pain is observed universally: it occurs at all ages, in all populations and has been reported throughout recorded history (Croft, Blyth, & Van Der Windt, 2011). At the same time, prevalence numbers vary widely depending on the methodology used, the sample population and the type of pain.

Based on the 2012 National Health Interview Survey in the United States, it was estimated that 126.1 million adults reported some pain during the previous 3 months, with 25.3 million adults (11.2%) suffering from daily pain and 23.4 million (10.3%) reporting a lot of pain. Another 14.4 million adults (6.4%) were classified as having the highest level of pain (based on the persistence and bothersomeness of the pain), with an additional 25.4 million adults (11.3%) experiencing daily moderate pain or high intense pain on some days (Nahin, 2015). Prior research has found back and neck pain to be among the most common pain conditions in the general populations. Estimates of the 12-month prevalence of spinal pain between 15 and 56% have been reported in adults (e.g., Demyttenaere et al., 2008). Neck pain is somewhat less common with 12-month prevalence rates between 12 and 34% (e.g., Rajala, Keinänen-Kiukaanniemi, Uusimäki, & Kivelä, 1995). Chronic back or neck pain problems are often found to be more common among females, older persons, and those with a lower educational attainment (Dionne et al., 2001; Von Korff et al., 2005). This enormous numbers show that pain is a major health care problem all over the world that needs to be taken seriously.

Impact

Chronic pain is not only highly prevalent, it also affects the quality of patients' social and working lives. Very few individuals with chronic pain (ICPs) are treated by pain specialists and almost half of them receive inadequate pain management (Breivik et al., 2006). Pain is often associated with anxiety and depressive disorders (Beesdo et al., 2010), restrictions in

working life (Breivik et al., 2006), and is a risk factor for alcohol abuse or dependence (Demyttenaere et al., 2007). At an interpersonal level, pain may also affect someone's relationship functioning (Geisser, Cano, & Leonard, 2005) and family live (West, Usher, Foster, & Stewart, 2012). For example, romantic partners of individuals with chronic pain reported elevated distress (Leonard & Cano, 2006), relational dissatisfaction (Geisser et al., 2005) and caregiver exhaustion (Jones, Hadjistavropoulos, Janzen, & Hadjistavropoulos, 2011). Several studies have shown that partners of ICPs may even experience clinically significant depressive symptoms (e.g., Ahern & Hendryx, 2008; Schwartz, Slater, Birchler, & Atkinson, 1991). Many of these older studies have been conducted with heterogeneous samples including diverse pain locations and aetiologies. For example, higher reports of depressive symptoms in spouses of ICPs were reported as compared to community samples (Ahern & Hendryx, 2008). Prevalence surveys indicated that 20 to 50% of the partners of ICPs reported significant depressive symptoms (Ahern & Hendryx, 2008; Flor, Turk, & Berndt Scholz, 1987; Kerns & Turk, 1984; Rowat & Knafl, 1985; Schwartz et al., 1991), compared with for example only 16 to 19% of females in a community control sample (Comstock & Helsing, 1976). Also other outcome measures have been investigated; partners of individuals with Fibromyalgia syndrome reported for example lower health and higher levels of depression, loneliness, and subjective stress than partners of healthy individuals (Bigatti & Cronan, 2002). Furthermore, greater patient knee pain at the end of the day was associated with partners' poorer overall sleep quality (Martire, Keefe, Schulz, Parris Stephens, & Mogle, 2013). A few older studies showed that marital affection in partners of ICPs was not negatively related with the severity of ICPs' pain (Basolo-Kunzer, Diamond, Maliszewski, Weyermann, & Reed, 1991), or was not predicted by the degree of caregiving (Feinauer & Steele, 1992). More recent and longitudinal studies show, however, that patients' greater pain intensity has been linked to their partner's poorer psychological well-being (Polenick, Martire, Hemphill, & Stephens, 2015;

Stephens, Martire, Cremeans-Smith, Druley, & Wojno, 2006). Mercurio-Riley and colleagues (2013) provide different plausible explanations for the variation in partner adjustment. Depending on the specific pain diagnoses, different coping mechanisms, levels and types of stressors and available support may contribute to this variation. Also other variables such as stress appraisal, coping resources and dispositional tendencies may play a role. It still remains to be investigated why some partners of ICPs are distressed or relationally dissatisfied.

At a societal level, the impact of chronic pain is likewise not negligible. There are direct health care costs (Manchikanti et al., 2009), but also indirect costs related with disability compensation, reduced levels of productivity, increased risk of leaving the labour market (Phillips, 2009) or work absenteeism (Dagenais, Caro, & Haldeman, 2008). These findings indicate that pain is not merely a sensory experience, but that it is also interwoven with disability and suffering. The high variability in pain, disability and suffering between persons has led to several evolutions in the theoretical conceptualization and management of pain.

Pain Definitions and Evolutions in Research

The conceptualization of pain has long been dominated by a biomedical perspective. This model followed a Cartesian view positing that the perception of pain is a direct representation of the sensorial input or in other words the physiological damage (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). Many other theories supported these biomedical models, for example the specificity theory of Von Frey (see Melzack & Wall, 1965), stating that there were unique pain receptors that are directly related to specific pain centres in the brain. According to this model, the degree of pain experienced would be directly proportional to the amount of tissue damage. During the 20th century, the role of psychological factors in explaining someone's pain experience gained attention. One famous study is the one of Beecher (as cited in Morley & Vlaeyen, 2010) about battle-wounded

soldiers. Wounded soldiers complained much more about pain during minor procedures a few days after their removal from the battlefield, compared with their pain shortly after their injuries. The idea was that no one-to-one relation between the wound and the pain experienced was present by definition. At first, the pain of the soldiers was secondary to having survived in the first place, so the emotional state of pain sufferers is important to take into account. Gradually, it was acknowledged that a biomedical perspective on pain is unsatisfactory in explaining someone's pain experience, as there is no direct relationship between physical damage and the pain experience. A biopsychosocial perspective upon pain was developed to better understand pain.

A first step was taken by Melzack and Wall (1965), who formulated the Gate Control Theory. It was stated that a "gate" in the dorsal horn of the spinal cord inhibits or facilitates pain processing. This gate system can be activated by both afferent nerves (i.e., sensorial input) and efferent nerves (i.e., descending from the brain). These efferent pathways made clear that the perception of pain can be influenced by cognitive (e.g., catastrophizing) and affective (e.g., pain-related fear) factors through descending central pathways. This theory was highly influential in pain research, because also psychological, and not merely sensory, aspects were taken into account. Congruent with this viewpoint, the International Association for the Study of Pain (IASP) defined pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Task Force on Taxonomy of the IASP, 1994). This definition highlights the fact that pain not only involves a sensory aspect, but also an affective one. Since this renewed definition, substantial advancements have been made in the understanding, assessment, and treatment of acute or chronic pain. In line with these advances, the definition of pain has recently been reviewed. The following definition is proposed (Williams & Craig, 2016, p.2420):

> *"Pain is a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components."*

The authors give three reasons for the necessity of an updated conceptualization. First, cognitive and social components were excluded in the previous definition, while these are clinically important characteristics (Low, 2013; Mogil, 2015), e.g. "fear-avoidance beliefs", resulting in activity restrictions, interference with valued life activities, and negative affect or "catastrophizing thoughts" leading to activity intolerance, work disability, or self-reported functional limitations (Sullivan, 2008). Also the social environment is important, for example the actions of observers leading to reductions of the pain stimulus or altering the pain experience (Hadjistavropoulos et al., 2011), or the tendency of health professionals to underestimate pain (Prkachin, Solomon, & Ross, 2007), with consequences for pain management. Second, pain describing as "unpleasant" trivializes the pain experience for those individuals with severe pain. And third, in the previous definition self-report is prioritized at the expense of nonverbal behaviours, which excludes individuals without adequate language or those with intellectual disabilities. It is argued that nonverbal communication plays a role in all clinical assessment. Although pain is often considered a personal experience, it is rarely completely private in nature, as it exists in a social context. The updated definition of pain acknowledges the social components of someone's pain experience. The dialectic interplay between the sufferer and the social environment has been articulated within various heuristic frameworks (Goubert et al., 2005; Hadjistavropoulos et al., 2011), to which we turn to next.

PART 2: PAIN AS A SOCIAL EXPERIENCE

The communications model of pain (Hadjistavropoulos et al., 2011) describes pain communication as a sequence with three steps. First, there is a

painful stimulus, leading to the experience of pain. Second, the experience of pain is encoded in expressive (verbal or non-verbal) behaviour, which is then in a third step decoded by an observer who interprets the experience of the person in pain. In turn, the responses of the observer can impact the first steps again. For example, perceived social support can positively impact the sufferer's pain experience (López-Martínez, Esteve-Zarazaga, & Ramírez-Maestre, 2008). The empathy model of pain (Goubert et al., 2005) precisely delineates diverse observer responses that may occur when facing another person in pain. It distinguishes cognitive (e.g., pain estimations), affective (e.g., feelings of sympathy or distress) and behavioural (e.g., helping) responses. The model further distinguishes top-down (i.e., variables related to the observer), bottom-up (i.e., variables related to the individual with pain), and contextual variables (i.e., type of relationship, affinity, attachment patterns) that influence observers' cognitive, affective, and behavioural responses. Studies can be divided into those that investigated top-down or bottom-up, or both, factors in explaining differences in observer responses and, as a consequence, differences in patient pain outcomes. **Chapter 2** provides a more detailed overview of these theoretical models and studies investigating factors that influence observer responses when interacting with someone in pain. Important questions remain how partners exactly impact patient and relationship outcomes by differences in their behavioural or caregiving responses. In the following section we elaborate on the impact of these observer responses upon the functioning and pain experience of the individual in pain.

An Introduction to the Concept of Social Support

Researchers have used a variety of terms (e.g. prosocial or helping behaviour, social support or caring responses) to conceptualize the study of caregiving. Providing support to individuals with one has a close relationships is distinguished from helping strangers. Helping within close relations is often expected because of the affectionate bond between the

individuals involved (Collins, Ford, Guichard, Kane, & Feeney, 2010), whereas helping strangers (e.g., volunteering, donating, mentoring, …) is considered nonobligatory (Omoto & Snyder, 1995). The domain of helping an individual, with whom one has a (close) relationship, encompasses different research traditions. A rich research domain is the study of *social support*, which relates to caring for familiar others and most notably romantic partners, friends, acquaintances, neighbours, and coworkers (Mayseless, 2016). Social support refers to social resources that people perceive to be available or that have been received from others in case of need (Cohen, Underwood, & Gottlieb, 2000).

Social support within dyadic intimate relationships – or also termed partner support – raises a seeming paradox that may be particularly informative for the context of pain. Specifically, studies have shown that while *perceived support availability* (the general sense that a person can get support if needed) is beneficial (e.g., Cohen, 2004; Reis, Clark, & Holmes, 2004), actual *received support* has yielded mixed results (Mcclure et al., 2014). Receiving different types of support sometimes has positive effects (Abraído-Lanza, 2004; Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993), but studies have also found null or even negative effects (Bolger & Eckenrode, 1991; Bolger, Foster, Vinokur, & Ng, 1996; Bolger, Zuckerman, & Kessler, 2000). In fact, findings suggest that, whereas the perceived availability of support tends to reduce distress, its actual receipt is often unhelpful and engenders feelings of inadequacy, and indebtedness (Rafaeli & Gleason, 2009). However, it remains unclear why or when observer responses are or are not helpful. It may be that different underlying motives for providing help relate to different types of helping behaviour.

In most studies, social support is assessed as part of adult relationships and denotes a large number of social activities that involve supporting and caring for others. Examples are expressing love to others, interest, liking, nurturance, advice, and various goods as well as demonstrating a willingness to help if necessary. Thus, social support has

been conceptualized as including instrumental (e.g., showing a person how to solve a problem), tangible (e.g., providing goods), informational (e.g., giving advice), and emotional (e.g., offering validation and reassurance) support (Mayseless, 2016). In the context of chronic pain, romantic partners are often the primary source of social support provision (Manne & Badr, 2008). Throughout this dissertation, the focus will be on research in the domain of romantic or intimate relationships where spouses provide support to their partner with (chronic) pain. The terms "caregiving", "social/partner support" and "helping behaviour" will be used interchangeably throughout the different chapters, and refer to the caregiving responses of romantic partners towards their partner with chronic pain. In an attempt to understand the impact of observer responses, or more specifically partner support, various theoretical models have been developed.

A Search for Theoretical Models

Because partners of individuals with chronic pain (ICPs) differ considerably in their helping responses, with resulting implications for ICP's functioning, various attempts have been undertaken to categorize helping responses of close others in terms of its expected impact upon sufferer's pain experience and behaviour (e.g., Fordyce, 1976). Emerging research now suggests that one particular type of helping response cannot, in and of itself, be considered adaptive or maladaptive (e.g., Bolger & Eckenrode, 1991; Bolger et al., 1996, 2000; Vervoort & Trost, 2017).

Most research in this regard has been informed by an *operant-behaviouristic view*. In this model a distinction is made between behaviours that reinforce (e.g., special attention, taking over tasks, also termed "solicitous responses") and those that discourage an individual's pain behaviours (e.g., ignoring pain displays or expressing irritation; also termed "punishing responses"). Receiving solicitous support is considered to be rewarding to those in pain, and hence, will positively reinforce pain behaviours and inadvertently promote further displays of pain. Prolonged

pain behaviour, in turn, may interfere with the usual healing process, thereby promoting the transition from acute pain to chronic pain and disability. In contrast, punishing response are assumed to decrease the likelihood of pain behaviour (Fordyce, 1976). This operant model of pain behaviour is not without shortcomings, as there are some inconsistent results reported. **Chapter 2** provides an overview of studies using this framework. An implicit idea is that ICPs tend to experience solicitous support as a positive, and hence, a rewarding or reinforcing experience, but this is not always the case.

The *intimacy process model* applied in the context of pain provides a further explanation for why solicitous responses may have beneficial effects. It is posited that these responses may also serve to enhance one's need for intimacy (Cano & Williams, 2010). This model makes a distinction between validating (empathic) and invalidating (non-empathic) responses. Validation refers to accepting and understanding the experience of another person, whereas invalidation refers to emotional distancing, as for example contempt or disrespect. **Chapter 2** provides an overview of the evidence supporting the beneficial effects of partner empathic and validation responses. This model suggests that helping behaviour exerts positive effects and empowers individuals in pain when it matches individuals' need for intimacy and closeness. This assumption remains to be investigated, but this need-based approach, is a promising avenue in understanding why the impact of observer responses is not fixed.

The *social support literature* commonly distinguishes between instrumental support (e.g., showing a person how to solve a problem), tangible support (e.g., providing goods), informational support (e.g., giving advice), or emotional support (e.g., offering validation and reassurance) (Mayseless, 2016). It was already stated that the actual support receipt may sometimes be experienced as unhelpful (Rafaeli & Gleason, 2009). Similar to findings in the pain literature, research has shown that none of these different types of responses can, in and of itself, be considered

(mal)adaptive. Within this literature, various models[1] have been put forward to explain these mixed results, as for example the optimal matching model of social support (Cutrona, 1990) or the skillful support framework (Rafaeli & Gleason, 2009). In these models it is often assumed that support is beneficial when it matches the needs of the support receiver. To date, it remains unclear which needs matter most, and for this reason the Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017) may be useful as an overarching framework for this dissertation.

PART 3: SELF-DETERMINATION THEORY

In this final part, we argue that to fully understand the actual consequences of others' helping responses, it is critical to consider 1) the extent to which these responses are supportive for the basic *psychological needs* of the person in pain (Deci & Ryan, 2000; Rafaeli & Gleason, 2009) and 2) the *motives* underlying these helping responses (Weinstein & Ryan, 2010). The latter can also provide an explanation for the variation in partner adjustment, as discussed above.

Three Basic Psychological Needs

SDT posits that, just as a plant needs soil, water, and light to thrive, individuals have a set of *basic psychological needs*, the satisfaction of which are essential for individuals to grow and reach their full potential (Deci & Ryan, 2000; Ryan & Deci, 2017). These needs are said to be psychological (rather than physiological), inherent (rather than acquired), universal (rather than culture-bounded) and fundamental (rather than trivial). The first one is the need for *autonomy*, referring to engaging in volitional activities and acting in accordance with one's authentic self. Then, there is the need for *competence*, involving feeling capable, self-efficacious, and optimally

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[1] A more extensive discussion of these models is provided in chapter 2.

challenged. And finally, the need for *relatedness* refers to having a sense of belonging and feeling connected to others, and is closely connected to the notion of intimacy as proposed by Cano and colleagues (Cano, Leong, Williams, May, & Lutz, 2012).

Depending on the degree to which these needs get satisfied or frustrated, one can reliably predict differences, both interpersonally as well intrapersonally, in well-being, (mal)adjustment and even psychopathology (Vansteenkiste, Niemiec, & Soenens, 2010; Vansteenkiste & Ryan, 2013). It is increasingly argued in SDT that need frustration is distinct from an absence of need satisfaction. Whereas low need satisfaction would fail to foster the growth of individuals, the frustration of these needs uniquely relates to ill-being (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Stebbings, Taylor, Spray, & Ntoumanis, 2012). The difference between satisfaction and frustration is critical as unfulfilled needs may not relate as robustly to malfunctioning as frustrated needs may (Vansteenkiste & Ryan, 2013). Furthermore, each of these three needs play a necessary part in optimal development, so that none of them can be thwarted or neglected without significant negative consequences. Within intimate relationships, partners can act either supportive or thwarting towards each other's needs. More specifically, a lack of need satisfaction involves being indifferent towards the partner's needs, whereas need frustration involves a more active and direct way of undermining the partner's needs. Throughout this dissertation we did not measure need satisfaction and frustration at a general level (Chen et al., 2015), but at a relationship-specific level, from now on called *relationship-based need satisfaction and frustration*. A more detailed overview of the role of psychological needs within the context of romantic relationships is provided in **Chapter 2**. In sum, using SDT in the context of pain, may be useful because three basic psychological needs are defined, that, when satisfied, have the potential for enhancing the wellbeing of individuals with pain. Most research in the domain of couples highlight

the role of relatedness-type needs (Patrick, Knee, Canevello, & Lonsbary, 2007), whereas SDT adds an important role for autonomy and competence.

Different Helping Motives

In our search for when helping behaviour is perceived as beneficial, it may be relevant to consider the underlying reasons for providing that help. Furthermore, taking into account why observers provide help or care might explain why caring for others with mental or physical health problems may lead to the development of helping burnout and distress (Geisser et al., 2005; Jones et al., 2011; Leonard & Cano, 2006; Vitaliano, Zhang, & Scanlan, 2003).

SDT distinguishes between autonomous and controlled behavioural regulation. *Autonomous motivation* is involved when individuals engage in behaviour because they consider it as interesting or as personally meaningful and/or congruent with their values and goals. *Controlled motivation* concerns the engagement in behaviour out of pressure and obligation, which may originate from forces outside or inside the individual. Across a variety of life domains (e.g., academics, employment, physical activity, health care), it has been found that autonomous motivation is related to better well-being and increased behavioural persistence, while controlled motivation contributes to lower well-being and psychopathology (Deci & Ryan, 2000; Vansteenkiste et al., 2010). SDT proposes that autonomous and controlled motivation differentially impact outcomes because these motives differentially relate to the fulfillment of the basic psychological needs for autonomy, competence and relatedness (Deci & Ryan, 2000). A more detailed description about the different subtypes of motivation, the characteristics and research findings is provided in **Chapter 2**. In sum, taking into account the different underlying motives for providing support can help us explain why some observers or support providers, such as romantic partners, behave in ways that are (not) responsive to the other person's needs.

AIMS AND OUTLINE

Chronic pain not only has a major impact upon the individuals with chronic pain (ICPs) themselves, but also upon their partners. Studies have demonstrated that partners of ICPs often report enhanced distress and relationship dissatisfaction (Cano, Gillis, Heinz, Geisser, & Foran, 2004; Geisser et al., 2005; Leonard & Cano, 2006). Evidence is also available on the predictive role of different helping behaviours in partners upon ICP outcomes (e.g., Newton-John, 2002, 2013; Raichle, Romano, & Jensen, 2011). Important unanswered questions, however, include why partners are distressed, and how partners impact ICP and relationship outcomes. Self-Determination Theory (SDT; Deci & Ryan, 2000) may be a useful framework to understand why chronic pain affects helping behaviour and outcomes in partners. Drawing from SDT, the aims of this dissertation are to investigate (1) how partners' motives for helping relate to the partners' own well-being and relationship satisfaction, (2) whether these effects radiate toward the pain experience and well-being of the ICP, (3) which processes (i.e., psychological need satisfaction and frustration and other help-related variables) can account for these effects, and (4) which antecedents predict partners' helping motives and helping behaviour. These **four aims** are being pursued throughout six empirical studies (see Figure 1 for a graphical representation of the aims pursued within the present dissertation). As shown in Table 1, a variety of designs (i.e., cross-sectional, diary, longitudinal & experimental) were used to examine these four aims. Throughout the six studies described within the present dissertation we tried to build a cumulative logic by gradually using more sophisticated designs and by moving beyond self-report assessment of partners' helping behaviour to also include an observational design.

This dissertation starts with a theoretical book chapter about the social context of chronic pain (**Chapter 2**), which can be considered as a general introduction to the subsequent chapters that describe the empirical

studies. Throughout this book chapter we argue that understanding the actual consequences of observer behavioural responses, that is, whether behavioural responses might be considered supportive/helpful or not, may depend upon the extent to which these responses are supportive of the needs for autonomy, competence and relatedness of the person in pain. Self-Determination Theory presents a strong theoretical framework for choosing these three needs as essential needs and additionally provides arguments why motivation for providing support is important to take into account.

Aim 1: To Examine the Association between Partners' Helping Motivation and Partner Outcomes

Given the lack of research that can explain why partners of individuals with chronic pain experience distress and relational dissatisfaction, our first aim was to examine the associations between partners' helping motivation and partner outcomes. In **Chapter 3**, we described a cross-sectional questionnaire study among chronic pain couples (N=48) examining the relationship between partners' type of motivation to help (i.e., autonomous vs. controlled) and personal and relational functioning in partners. We hypothesized that partners who were more autonomously motivated to provide help would report better individual wellbeing and a higher relationship quality. Next, we moved from a 'between-person' to a 'day-to-day' approach, thereby examining whether the hypothesized association between partners' helping motivation and partner outcomes would also apply at the within-couple level. In **Chapter 4**, a diary study is reported in which partners (N=70) were assessed for 14 consecutive days. Diary designs allow for the close examination of dynamic daily processes in an individual's natural environment thereby increasing the ecological validity of the findings. Measurement error due to biased retrospective recall is minimized as participants provide assessments every day (Bolger, Davis, & Rafaeli, 2003). Using this design, we could examine whether day-to-day variation in partners' type of helping motivation would relate to day-to-day

variation in partner outcomes, and more specifically partners' affective (e.g., positive affect), relational (e.g., conflict) and help-specific (e.g., exhaustion) functioning. We hypothesized that partners who reported higher autonomous, relative to controlled, helping motives during the day would also report better affective, relational and help-specific functioning.

Aim 2: To Examine the Association between Partners' Helping Motivation and ICP Outcomes

Although the social dimensions of pain have now generally been recognized (Williams & Craig, 2016), it remains unclear how partners exactly impact ICP outcomes by differences in their behavioural or caregiving responses. In our second aim, the associations between partners' helping motivation and ICP outcomes were examined. In our cross-sectional questionnaire study (*N*=48), as described in **Chapter 3**, the relationship between partners' type of helping motivation and ICP outcomes was also investigated. We hypothesized that higher autonomous helping motives in partners would relate to better individual wellbeing and relationship quality in ICPs. Next, in the diary study reported in **Chapter 4**, also ICPs (*N*=70) were assessed for 14 consecutive days. In line with Aim 1, we could examine whether day-to-day variation in partners' type of helping motivation would relate to day-to-day variation in ICP outcomes, and more specifically ICPs' affective (e.g., positive affect), relational (e.g., conflict) and help-specific (e.g., satisfaction with received help) outcomes. We hypothesized that when partners reported higher autonomous, relative to controlled, helping motives during the day, ICPs would also report better affective, relational and help-specific functioning. Finally, in **Chapter 5** (*N*=141), we assessed the longitudinal associations between partners' helping motivation and ICPs' functioning across time, with ICPs' relationship-based need satisfaction and frustration as intervening variable (see Aim 3). By using a longitudinal design, we were able to assess temporal associations between partners' helping motivation and ICPs' functioning

across time and to discover the direction of effects by using cross-lagged analyses. We expected that partners' autonomous, relative to controlled, helping motivation, would (mainly indirectly) relate to an increase in ICPs' wellbeing and a decrease in ICPs' distress over time.

Aim 3: To Examine the Processes that Explain the Effects of Partners' Helping Motivation upon Partner and ICP Outcomes

Given that Aim 1 and 2 examined the main effects of partners' helping motivation, Aim 3 focused upon the underlying mechanisms explaining these effects. Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017) posits that basic psychological needs (i.e., need for autonomy, competence and relatedness) are essential nutriments for one's intrapersonal and interpersonal functioning. Helping behaviours, when volitional or autonomous, may have the capacity to facilitate the satisfaction of each of these needs (Gagné, 2003). In the cross-sectional questionnaire study (*N*=48), as reported in **Chapter 3,** also mechanisms (i.e., helping exhaustion and relationship-based need satisfaction) were investigated underlying the association between partners' type of motivation to help (i.e., autonomous vs. controlled) and personal and relational functioning in partners and ICPs. In **Chapter 4** (*N*=70) we continued to examine the explanatory role of relationship-based need satisfaction and frustration, this time using a diary design. We examined whether day-to-day variation in relationship-based need satisfaction and frustration would account for the day-to-day association between partners' helping motivation and partner and ICP outcomes. We hypothesized that on days that partners reported more autonomous helping motives, both partners and ICPs would report more need satisfaction and lower need frustration, which in turn would contribute to better individual, relational and help-specific outcomes in partners and ICPs.

While in **Chapter 3 and 4** we focused on the explanatory role of relationship-based need satisfaction and frustration for both partner and ICP

outcomes, in **Chapter 5** (*N*=141) we only focused on ICP outcomes. By using a longitudinal design, we were able to assess temporal associations between partners' helping motivation and ICPs' functioning across time, with ICPs' relationship-based need satisfaction and frustration as intervening variables. This design allows us to control for initial levels of all variables and for all within-time associations. With this conservative way of testing, we can for example investigate whether partners' helping motivation, measured at time 1, relates to increases or decreases in ICP variables three months later. More specifically, we hypothesized that partners' autonomous helping motivation would relate to increases in ICPs' relationship-based need satisfaction and to decreases in ICPs' relationship-based need frustration over time. Furthermore, we expected that ICPs' relationship-based need satisfaction would be associated with an increase in ICPs' wellbeing and a decrease in ICPs' distress, while the opposite effects were expected for ICPs' relationship-based need frustration.

Finally, we wanted to investigate the processes explaining why partners' autonomous helping motivation would be beneficial for ICPs' need-based experiences. Using a diary design, **Chapter 6** (*N*=134) combined the data set of chapter 4 (*N*=70) and chapter 7 (*N*=64) and considered the role of received help and the timing of the received support. It was hypothesized that ICPs' received partner support would explain the association between the day-to-day variation in partners' helping motivation and the day-to-day variation in ICPs' daily relationship-based need satisfaction and frustration. Furthermore, it was hypothesized that the timing of the received partner support would moderate the effects of received partner support in ICPs. Support can be well-meant by the help provider, but misguided due to the wrong timing of the help such that the help is not perceived to be helpful by the recipient of help (Rafaeli & Gleason, 2009).

Aim 4: To Examine Antecedents of Partners' Helping Motivation

Our fourth and final aim was to investigate possible antecedents of partners' helping motivation and more broadly partners' helping behaviour. By means of a diary approach, **Chapter 7** (*N*=64) examined the association between day-to-day fluctuations in 1) partners' experienced goal conflict (i.e. the amount of interference between helping your partner and other goals) and 2) ICPs' expressed gratitude (i.e. expressed and perceived appreciation for received support) and partners' daily helping motivation. In addition, given that goal conflict and helping motivation could be reciprocally related, in **Chapter 8** we examined the causal effects of partners' goal conflict upon partners' helping motivation, and a set of other intrapersonal and interpersonal outcomes. This was done in an experimental study among chronic pain couples (*N*=68). For this study, couples were invited to the Social Pain Lab at our faculty, which was set up as a living room. Dyads were videotaped while performing household tasks together, to allow coding of partners' helping behaviours. We hypothesized that the goal conflict induction would impact partners' affect, helping motivation and self-reported and observed helping behaviour. This chapter is the only study that included observations. These data provide the unique opportunity to compare self-report measures of partners' helping behaviour, as reported by both the partner and the ICP, with the observational assessment of that behaviour.

Table 1. Overview of empirical studies

Chapter	Studies	Aims	Design	*N* (couples)	Sample	*M* age Patients (years)	Female Patients	Measures	Analytical Technique
Chapter 3	Study 1	1, 2 &3	Cross-sectional	48	Clinical (sample A)	53.00	75%	Self-report	SEM
Chapter 4	Study 2	1, 2 & 3	Diary	70	Clinical (part sample B)	54.71	75.7%	Self-report	Multilevel regression
Chapter 5	Study 3	2 & 3	Longitudinal	141	Clinical (sample B)	52.38	82.1%	Self-report	Cross-lagged analyses
Chapter 6	Study 4	3	Diary	134	Clinical (sample B)	51.73	82.8%	Self-report	Multilevel regression
Chapter 7	Study 5	4	Diary	64	Clinical (part sample B)	48.56	90.6%	Self-report	Multilevel regression
Chapter 8	Study 6	4	Experimental	68	Clinical (sample C)	49.68	91.2%	Self-report & Observational	Repeated measures ANOVA

Note. SEM = structural equation modeling, ANOVA = analysis of variance.
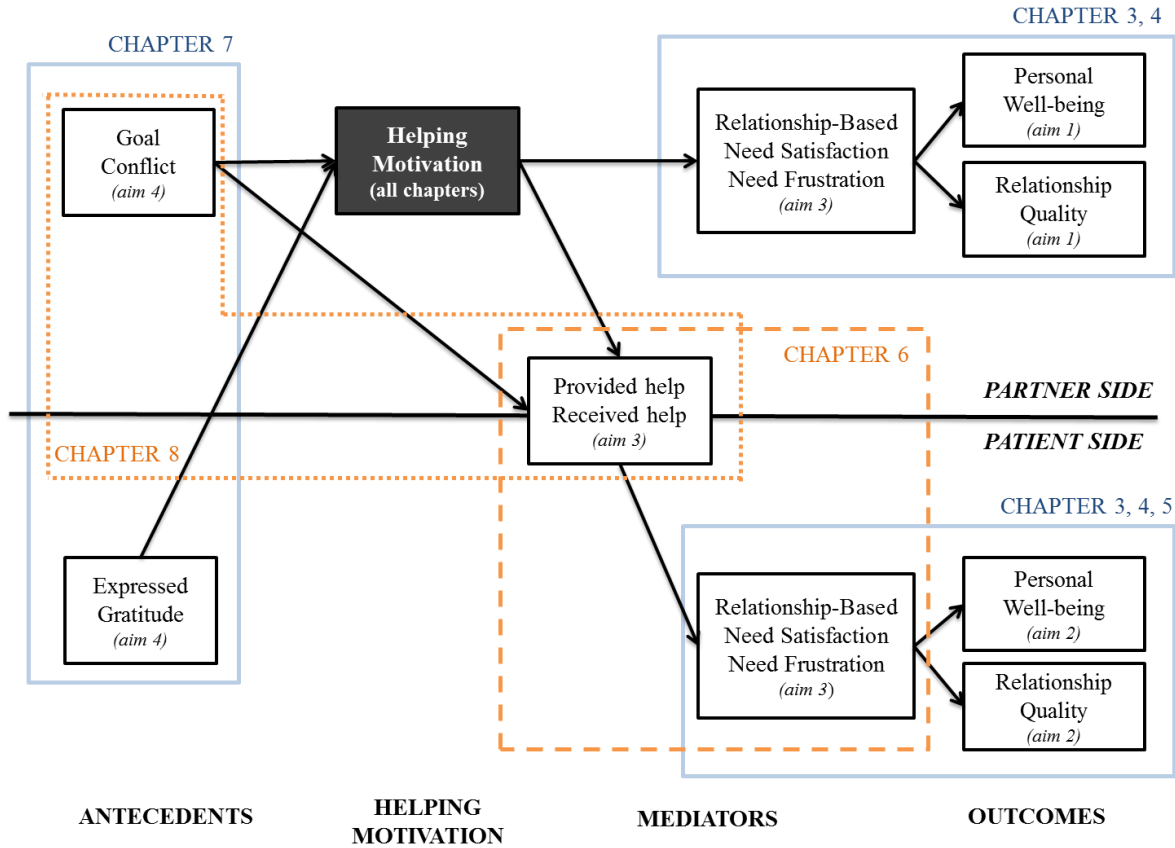
Figure 1. Graphical representation of the aims of the dissertation

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CHAPTER 2

CHRONIC PAIN AND INTERPERSONAL PROCESSES: A NEED-BASED APPROACH[1]

In this chapter, the authors argue that one particular type of a caregiver's behavioral response to pain cannot, in and of itself, be considered adaptive or maladaptive. They contend that to understand the complexity of the interaction between caregivers and pain sufferers, a goal or need-based framework may be useful. Self-Determination Theory (SDT) will be presented as a heuristic framework that identifies three basic psychological needs as essential for successful adaption. Whether behavioral responses are supportive/helpful, depends upon the extent to which these responses support the need for autonomy, competence and relatedness of the sufferer. Drawing on an affective-motivational account on interpersonal dynamics in the context of pain, the authors highlight how observer attunement towards sufferers' needs may depend upon the regulation of various goals for caregiving including self- versus other-oriented goals and associated emotions.

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[1] Kindt, S., Goubert, L., Vansteenkiste, M., & Vervoort, T. (in press). Chronic pain and interpersonal processes: A need-based approach. In P. Karoly & G. Crombez (Eds.), In *Motivational perspectives on chronic pain: Theory, research, and practice*. Oxford University Press

TABLE OF CONTENTS

1. INTRODUCTION

Pain typically takes place within an interpersonal context. For instance, the spouse of a patient suffering from chronic pain may be worried and overprotective in order to prevent further harm to his/her loved one. Another spouse might react indifferently or display negativity. We can well imagine that these two responses may have different effects on the well-being of the patient. Several attempts have been undertaken to categorize responses of others in terms of their *expected* impact upon the sufferer's pain experience and behavior. Traditional conceptualizations have distinguished between responses that are helpful or beneficial, and responses that are non-supportive or even detrimental. The operant framework in the context of pain, originally formulated by Fordyce (1976), has received most attention in this regard, and continues to influence pain literature and clinical intervention (Main et al., 2015). Although the operant framework has advanced the field by acknowledging the critical role of observer behavior (e.g., reward and/or punishment) in understanding pain outcomes, it has become increasingly clear that it falls short in capturing the nuances and the complexity of interpersonal dynamics in the context of pain. Most problematic is that the majority of studies on the impact of observer behavior are based on a priori expectations of the reinforcement value of observer responses.

Accumulating research suggests that one particular type of behavioral response cannot, in and of itself, be considered adaptive or maladaptive (e.g., Bolger & Eckenrode, 1991; Bolger, Foster, Vinokur, & Ng, 1996; Bolger, Zuckerman, & Kessler, 2000). A priori categorizations about beneficial or detrimental qualities of behavioral responses under-represent the complexity of the interaction between observers and co-actors and pain sufferers. For instance, solicitous responses, such as providing reassurance or taking over household chores (Kerns, Turk, & Rudy, 1985), are expected to increase pain behaviors; yet, evidence has shown that this is not always the case and these types of support behaviors do not always

reinforce pain behaviors (Newton-John, 2002). In this chapter, we argue that goal or need-based approaches provide a valuable explanation for the mixed findings on the effects of caregiving responses on individuals' pain experience and behavior. In this endeavor, we will draw on the social support literature, Self-Determination Theory (SDT, Deci & Ryan, 2000), and an affective-motivational account on interpersonal dynamics in the context of pain (Vervoort & Trost, 2017). The basic tenet is that understanding the actual consequences of observer behavioral responses depends upon the extent to which these responses are supportive of *the goals or needs of the person in pain.*

2. PAIN AS AN INTERPERSONAL EXPERIENCE

Although pain is a personal experience, it is rarely entirely private in nature. The sufferer's voluntary (i.e., purposeful) and involuntary (i.e., reflexive) behaviors communicate pain and associated distress to others, and may elicit emotional and caregiving responses from others, which, in turn, can affect the sufferer's pain experience and expression (Hadjistavropoulos et al., 2011). This dialectic interplay between the sufferer and the social environment has been articulated within various heuristic frameworks (Goubert et al., 2005; Hadjistavropoulos et al., 2011). We briefly discuss these frameworks.

2.1 Heuristic frameworks

The *communications model of pain* (Hadjistavropoulos et al., 2011) is based upon Rosenthal's (1982) communication model and delineates how observers decode and react to the psychological states and behaviors of others. This model encompasses both non-verbal (e.g., facial expressions) and verbal (e.g., talking about pain) modes of communications of pain. In line with Rosenthal's descriptions, the process of communication is described as a three-step sequence (see Figure 7.1), and directs attention to the dynamics and complexity of the information transmission process

between those suffering from pain and observers. The sequence typically is initiated by a painful stimulus or tissue damage, which may lead to the internal experience of pain (Step A), and the subsequent encoding in expressive behavior (Step B). These expressions of individuals in pain may then be decoded (Step C) by the observer, allowing him or her to make inferences about the experience of the sender (i.e., the person in pain). In turn, the actions or responses of the observer can exert an impact upon processes in Step A and processes in Step B.

The *empathy model of pain* (Goubert et al., 2005; Goubert, Vervoort, & Craig, 2013) refines the *various* observer responses that may occur when the observer is faced with another in pain. This model (see Figure 7.1) brings to the fore the capacity of observers to empathize with another person in pain. The model distinguishes cognitive, affective and behavioral empathic responses that are, although distinct, closely related to each other. Observer *cognitive* responses are broadly defined as "a sense of knowing the experience of the other" (p. 287; Goubert et al., 2005), reflecting the observers' estimates of sufferer's pain). *Affective* responses refer to the feelings that arise when being faced with another in pain (e.g., feelings of sympathy or distress). Accumulating evidence suggests that facing others in pain often elicits affective distress in observers (Craig, 1968; De Ruddere, Goubert, Vervoort, Prkachin, & Crombez, 2012). Finally, *behavioral* responses refer to actual caregiving responses which may vary widely and include observer actions that are expected to diminish pain and suffering (e.g., provision of pain medication) as well as behavioral responses that are expected to perpetuate sufferer's pain and distress (e.g., displays of irritation and criticism).

2.2 Variables impacting observer responses to pain

The empathy model distinguishes top-down (i.e., features of the observer's knowledge and other dispositions), bottom-up (i.e., features within the patient of the incoming stimulus and the reactions to it), and

contextual variables (i.e., type of relationship, affinity, attachment patterns, etc.) that influence observers' cognitive, affective, and behavioral empathic responses.

One of the most robust top-down variables affecting observer empathic responses is the extent to which the *observer has catastrophizing thoughts* about the pain of somebody else. Catastrophizing is defined as an exaggerated negative orientation towards actual or anticipated pain experiences (Sullivan, Bishop, & Pivik, 1995). In the context of pediatric pain, research indicates that higher levels of parental catastrophizing about child pain is associated with heightened estimations of pain intensity in the child (i.e., step C decoding pain or cognitive response; Hadjistavropoulos et al., 2011), greater parental distress (i.e., affective response) (Goubert, Eccleston, Vervoort, Jordan, & Crombez, 2006; Goubert, Vervoort, Sullivan, Verhoeven, & Crombez, 2008), a greater action tendency of wanting to stop their child's pain (Caes, Vervoort, Eccleston, Vandenhende, & Goubert, 2011), and an increased parental engagement in more protective behaviors, such as restricting the child's activity to prevent further harm or pain (i.e., behavioral response) (Caes, Vervoort, Eccleston, & Goubert, 2012).

Similar findings have been observed among adults. Studies have revealed that catastrophizing thoughts about one's partners' pain are associated with a low mood and anxiety in both the catastrophizing partner (Leonard & Cano, 2006) and the patient partner (Cano, Leonard, & Franz, 2005), less empathic accuracy (i.e., reduced accurately in taking the perspective of the partner) (Leonard, Issner, Cano, & Williams, 2013), and more unsupportive responses by the catastrophizing partner during partner-patient interactions as reflected by increased invalidating responses (Cano, Leong, Williams, May, & Lutz, 2012). Research suggests that unsupportive reactions are accounted for by observers' emotional distress elicited by facing another in pain (e.g., Caes et al., 2011). It has been posited that observers often pursue the self-oriented goal of wanting to diminish their own level of distress elicited by viewing another person in pain, a process

that may compromise observers' ability to adequately attend to pain sufferers' needs or goals and respond to them accordingly (Simons, Goubert, Vervoort, & Borsook, 2016; Vervoort & Trost, 2017).

Empathic responses do not only depend upon top-down influences. Bottom-up influences, reflecting differences in individuals suffering from pain may also affect observers' responses. The extent to which pain is behaviorally expressed has been identified as a powerful *bottom-up* factor. Behavioral expressions may include: (1) paralinguistic vocalizations, such as moaning or crying; (2) other nonverbal qualities of speech, such as volume, hesitancies or timbre; (3) visible physiological activity, such as pallor, sweating or muscle tension; (4) bodily activity, including involuntary reflexes and purposeful action; and (5) facial expressions (Craig, Prkachin, & Grunau, 2010). Different ways of expressing pain may serve different functions (Sullivan et al., 2006; Williams, 2002). For example, limb and bodily activity are considered to primarily serve to terminate pain or to prevent the body from further hurt or harm. In contrast, speech and facial expression can control pain only indirectly, and may primarily function to convey distress to and recruit help from others (Hale, 1997; Poole & Craig, 1992). The communicative value of the latter type of behavior has been supported by numerous research findings. For example, when patients with chronic pain express high-intensity pain (by a combination of facial expressions and active pain behavior) observers estimated their pain to be more intense, and reported more sympathy and a greater inclination to help these patients (De Ruddere, Bosmans, Crombez, & Goubert, 2016; De Ruddere, Goubert, Stevens, Amanda, & Crombez, 2013). Other studies have shown that observers largely rely on facial displays of pain instead of bodily movements to estimate a person's pain intensity (Martel, Thibault, & Sullivan, 2011; Sullivan, Martel, Tripp, Savard, & Crombez, 2006). Observers also seem to interpret the different types of pain differently. Martel, Wideman and Sullivan (2012) found that patients displaying protective pain behaviors (e.g., guarding, rubbing) were perceived as being

less trustworthy, and less ready to work compared to patients who communicate pain by means of facial expression of pain.

Besides pain behavior, other factors relating to the individual sufferer are described in the empathy model of pain, such as sufferers' level of pain catastrophizing, emotional disclosures about pain-related distress and support entitlement, and pain duration. Recent studies have investigated the impact of these bottom-up influences (Burns et al., 2015). Studies indicate that the degree of pain catastrophizing not only plays a role among observers, but also among those suffering from pain (Sullivan, 2012; Sullivan et al., 2001, 1995). In a diary study with married couples (Burns et al., 2015), pain catastrophizing of the patient (partner) was associated with a mix of positive and negative responses by the spouse. Cano et al. (2012) found that greater helplessness about pain on the part of the individual with chronic pain was associated with more unsupportive spouse responses. However, in a study by Burns et al. (2015), spouse behavior toward the patient appeared more consistently positive three hours after patients' pain catastrophizing appeared. Such findings are probably accounted for by increased pain expressiveness amongst those who highly catastrophize about own pain (see e.g., Vervoort et al., 2008), which, as noted above, strongly influences observer responses to sufferer's pain.

Not only pain expression and associated catastrophizing affect observer responses. Evidence suggests that the extent to which patients disclose their pain-related distress (e.g., express their worry and sadness about pain) impacts spousal support. In an observational study, pain disclosure was found to elicit more supportive responses (i.e., showing acceptance and understanding in a nonjudgmental manner) relative to unsupportive (i.e., contempt, disrespect and non-acceptance) responses by spouses (Cano et al., 2012). In the case of limited emotional disclosure, an unsupportive response was less likely to occur, compared to the consequences for patients who disclosed more often. Interestingly, unsupportive spouse responses were frequently expressed after other

strategies were attempted. This finding may suggest that spouses became frustrated after repeated expressions of their partners' pain-related distress. In line with this notion, when individuals with pain feel more entitled to receive support (i.e., when a patient thinks that others are responsible for providing pain-related support) and become more demanding for help, more unsupportive spouse behaviors are observed (Cano, Leong, Heller, & Lutz, 2009).

Noteworthy also is that the *actual* behavioral responses of others do not necessarily correspond with *perceived* observer responses by the individual in pain. Actual and perceived responses may be influenced by different bottom-up and top-down influences (see also Figure 7.1). For example, research on the impact of the sufferer's pain catastrophizing upon *perceived* observer behavior has shown that while persons in pain who report high levels of pain catastrophizing express higher levels of pain behavior, desire more support, and feel more entitled to receive support (Cano et al., 2009; Thibault, Loisel, Durand, Catchlove, & Sullivan, 2008; Vervoort et al., 2008), they perceive their partner's response styles as more punitive rather than supportive (Boothby, Thorn, Overduin, & Charles Ward, 2004; Gauthier, Thibault, & Sullivan, 2011).

To date, most research has focused on the impact of the characteristics of the individual in pain (instead of the observer) in explaining others' responses. Research shows mixed patterns, such that pain catastrophizing (of the individual with pain) and the associated pain expression, sometimes elicits supportive responses and sometimes elicits unsupportive responses. In other words, although expressing pain verbally or nonverbally might cause an increase in support, the probably well-intended support provisions are not always perceived as being supportive (e.g., Boothby et al., 2004).

Finally, *contextual* variations (e.g., type of the interpersonal relationship, affinity, attachment patterns) may also influence observers' empathic responses towards a sufferer's pain. For instance, Englis et al.

(1982) found that seeing somebody in pain elicited distress when the observer had a cooperative relationship, but not when the observer had a competitive relationship with the sufferer. More recently, Bailey and colleagues (2015) found that caregivers' attachment avoidance was negatively associated with providing support aimed at alleviating the pain. Individuals high in attachment avoidance are believed to have had caregivers who were consistently unavailable and rejecting. These individuals therefore develop a discomfort with emotional closeness, emphasize self-sufficiency and provide low levels of support to their partner (Feeney & Collins, 2001).

Both the communications model of pain and the empathy model of pain provide a valuable framework for understanding how pain can be constructed as an interpersonal experience (Goubert et al., 2005; Hadjistavropoulos et al., 2011). Various studies have supported the validity of these frameworks by showing that bottom-up, top-down, as well as contextual influences affect observer cognitive, affective and behavioral responses towards the person in pain. These observer responses may be supportive or unsupportive. However, it remains unclear why or when observer responses are or are not helpful. In an attempting to understand the impact of observer responses, various theoretical models have been developed.
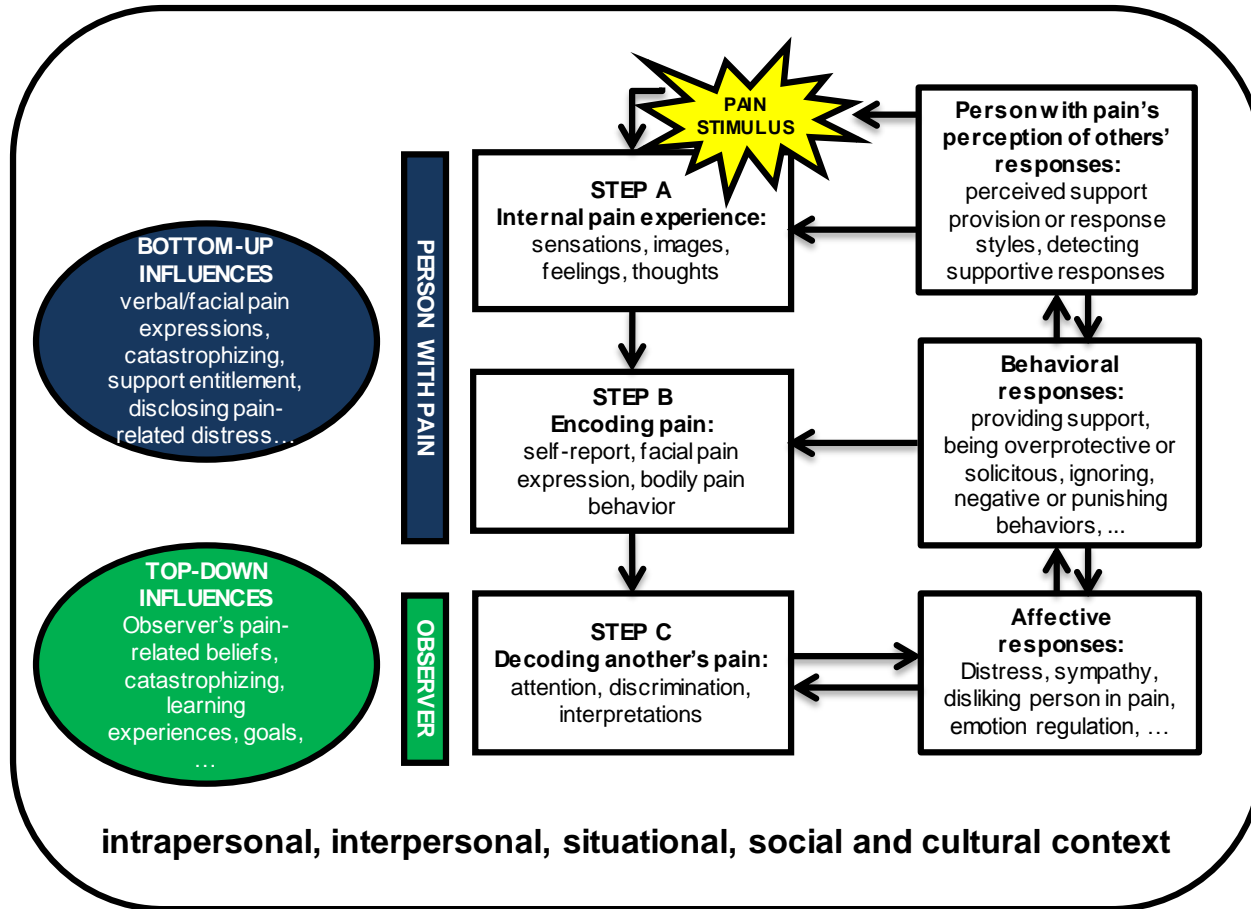
Figure 7.1. Pain as an interpersonal experience (adapted from Goubert et al., 2005 and Hadjistavropoulos et al., 2011).

3. THE IMPACT OF OTHERS UPON PAIN: THEORETICAL MODELS

3.1 Operant Theory

The operant model of pain behavior, as originally proposed by Fordyce (1976), is one of the major models that seeks to explain why pain is affected by the response of the immediate social environment. That explanation occurs via principles of operant reinforcement. More specifically, Fordyce (1976) distinguishes between behaviors that reinforce and those that discourage (or punish) an individual's pain displays. Reinforcement may result from the provision of care and special attention, such as taking over the usual tasks and responsibilities of the person in pain. This type of response have also been labeled as *solicitous* response (Newton-John, 2002). Fordyce's model has drawn attention to the importance of identifying and changing solicitous responses, as these are expected to affect and shape pain behaviors (e.g., complaining of pain, moaning, holding the affected area, moving carefully to prevent further pain, and grimacing). Specifically, receiving solicitous support is considered to be rewarding to those in pain, and hence, it is expected to positively reinforce pain behaviors and to inadvertently promote further displays of pain. Prolonged pain behavior, in turn, may interfere with the usual healing process, thereby promoting the transition from acute pain (e.g., from injuries) to chronic pain and pain-related disability. In contrast, observer responses such as ignoring pain displays or expressing frustration and irritation (e.g., "for goodness sake, stop complaining about your back!") have been labeled *punishing* or *discouraging* responses. These are hypothesized to decrease the likelihood of pain behavior. For example, ignoring or reacting negatively to a display of pain usually leads to a decrease or extinction of that behavior (Romano et al., 1992). However, no longitudinal study has yet examined the extent to which receiving solicitous or punishing responses are related to changes in pain behavior and disability over time (Leonard, Cano, & Johansen, 2006).

The impact of observer responses on sufferers' pain and their pain behavior has gained considerable attention after Fordyce's original publication (see e.g., Paulsen & Altmaier, 1995; Romano et al., 1992), with evidence providing support for operant behavior models of chronic pain (Newton-John, 2002). In particular, studies have shown that receiving *solicitous* support is positively associated with self-reported pain-related disability (Fillingim, Doleys, Edwards, & Lowery, 2003; Williamson, Robinson, & Melamed, 1997) and poorer functioning (Kerns et al., 1991; Lousberg, Schmidt, & Groenman, 1992; Romano et al., 1995). These associations appear robust, as they have been observed among various patient samples including patients with spinal cord injuries and amputees (Jensen, Moore, Bockow, Ehde, & Engel, 2011), headache patients (Pence, Thorn, Jensen, & Romano, 2008), men with chronic prostatitis (Ginting, Tripp, & Nickel, 2011), and patients suffering from chronic fatigue (Romano, Jensen, Schmaling, Hops, & Buchwald, 2009). In further support of the operant model, observational studies have shown that patient pain behaviors and partner solicitous responses tend to follow each other sequentially (Romano et al., 1992). Likewise, receiving *punishing* responses, has been found to be associated with lower levels of patient pain behavior and higher activity levels (Flor, Kerns, & Turk, 1987).

However, there are some inconsistencies. For instance, research has shown that negative responses to pain behavior, such as expressing irritation or frustration or ignoring the patient, may result in patients being likely to be depressed (Kerns, Haythornthwaite, Southwick, & Giller, 1990), more anxious (Cano, Gillis, Heinz, Geisser, & Foran, 2004), and relationally dissatisfied (Kerns et al., 1991). Negative expressions in response to pain behavior have likewise been found to be positively correlated with patient disability (Buenaver, Edwards, & Haythornthwaite, 2007; Raichle, Romano, & Jensen, 2011). In addition, several studies have shown no associations between solicitousness and patient disability (see e.g., (Campbell, Jordan, & Dunn, 2012; Flor, Kerns, et al., 1987; Schwartz, Slater, & Birchler, 1996) or

have found evidence counter to expectations, such that solicitousness buffered the negative effects between catastrophizing and disability (see e.g., Vervoort, Huguet, Verhoeven, & Goubert, 2011). There may be various reasons why operant principles fall short in explaining the impact of observer responses. One likely explanation is the often used assumption about the inherently rewarding or punishing quality of a given type of response. An implicit idea is that those in pain tend to experience solicitous support as a positive, and hence, as a rewarding or reinforcing experience. However, Newton-John and Williams (2006) found, among individuals with chronic pain, that solicitous support behaviors from partners were perceived as rather negative responses, making them feel helpless, infantilized, or burdensome. Further, findings indicate that the effects of solicitousness differ as a function of individual differences in patients, such as mood disturbance (Campbell et al., 2012) and marital satisfaction (Flor, Turk, & Berndt Scholz, 1987). Below, we argue that goal or need-based theoretical approaches provide a promising avenue in understanding why the impact of a given type of observer response is not fixed. Specifically, the *intimacy process model* applied in the context of pain provides a possible explanation of the beneficial effects of 'solicitous' responses, by positing that these responses may also serve to enhance one's need for intimacy. The broader *social support literature* as well as *motivational literature* likewise points to the importance of attuning helping responses to one's goals or needs.

3.2 Intimacy process model

According to the intimacy process model, intimacy develops when a person's self-disclosure of emotions is met with empathic and *validating* responses of another person. A validating response is defined as a response reflecting understanding and acceptance of the experience of another person (Cano & Williams, 2010). While sharing some overlap with solicitous behaviors, validating responses viewed within the intimacy process model are not conceptualized in operant-behavioral terms (e.g., as reinforcers of

pain behaviors), but are thought to promote emotional intimacy and closeness within a relationship. Examples include empathic listening, verbally reflecting and acknowledging, clarifying and summarizing, reciprocating vulnerability, and responding with action.

In a similar vein, *invalidating* responses and punishing responses have some similarities, but invalidation refers more broadly to emotional distancing rather than in terms of extinction of pain behaviors. Invalidation consists of statements that convey contempt, disrespect, and non-acceptance of the pain sufferer's experience. Examples demonstrate that this is a broad category, as it includes non-empathic responses to a partner's emotional expressions, inattentiveness to a partner's emotion, missed opportunities for validation, changing the subject, telling the spouse what they should be thinking/feeling, or putting the spouse down (Cano et al., 2012). Research has shown that the patient's self-disclosure of emotions as well as the partner's responsiveness and empathy predict relationship intimacy and satisfaction (Laurenceau, Barrett, & Pietromonaco, 1998; Long, Angera, Carter, Nakamoto, & Kalso, 1999; Mitchell et al., 2008). In the context of pain, verbal communications about one's thoughts and feelings regarding pain may entail attempts to disclose emotion, recruit emotional support, and build intimacy. In contrast to operant models, in which talking about pain constitutes pain behavior that is better extinguished, intimacy process models (Laurenceau et al., 1998) conceptualize such behavior as emotional self-disclosure. An empathic or validating response, following an emotional self-disclosure, may then lead to an increase in closeness and relationship satisfaction (Laurenceau, Barrett, & Rovine, 2005) that empowers the person in pain to more adequately cope with or regulate pain, rather than serving as reinforcement of pain behavior and the associated suffering of the person in pain (Edmond & Keefe, 2015).

Evidence supports the beneficial effects of partner empathic and validating responses. For instance, Kasle and colleagues found that patients with rheumatoid arthritis reported better psychological and physical health

when they had partners who provided validating responses (Kasle, Wilhelm, & Zautra, 2008). Stephenson and colleagues found that empathic responding from the spouse buffered against negative effects of partner depression on functional and marital outcomes for patients with rheumatoid arthritis one year later (Stephenson, DeLongis, Esdaile, & Lehman, 2014).

To date, the notion that observer caregiving exerts positive effects and empowers individuals in pain when it matches individuals' *needs* for emotional intimacy and closeness remains to be investigated. Yet, the idea that support is beneficial when it matches with one's needs is clearly echoed in the broad social support as well as the motivation literature.

3.3 Social support literature

The social support literature commonly distinguishes between instrumental support (e.g., showing a person how to solve a problem), tangible support (e.g., providing goods), informational support (e.g., giving advice), or emotional support (e.g., offering validation and reassurance) (Mayseless, 2016). Research has shown that none of these different types of responses can, in and of themselves, be considered "adaptive". Findings have also demonstrated that receiving high levels of these types of support may contribute to positive effects (Abraído-Lanza, 2004; Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993). However, studies have also found null or even negative effects (e.g., Bolger & Eckenrode, 1991; Bolger, Foster, Vinokur, & Ng, 1996; Bolger, Zuckerman, & Kessler, 2000). In fact, findings suggest that whereas *perceived support availability* (the general sense that a person can get support if needed) is beneficial (e.g., Cohen, 2004) the results for actual *received support* are mixed (Mcclure et al., 2014). To account for these inconsistent and sometimes paradoxical findings, various models have been put forward with one common denominator: support is beneficial when it matches receivers' personal needs. For instance, the *optimal matching model of social support* (Cutrona, 1990) posits that the specific needs of the support seeker derive from

multiple sources, including the preferences of the support seeker (Horowitz et al., 2001) and the nature (e.g., the controllability) of the stressor (Cutrona & Russell, 1990). Uncontrollable events require emotional support, whereas controllable events require instrumental support. In line with the optimal matching model (and related to intimacy process models described above), Reis (2004) introduced the concept of *perceived partner responsiveness to one's needs* as a core concept in the study of intimacy and closeness. He argued that relationship quality depends on beliefs about a partner's responsiveness - that is, on the perception that a partner understands, values, and supports important aspects of the self. The extent to which the individual believes that their partner understands, validates, and cares is crucial to build a satisfying and lasting romantic relationship. This concept is closely related to validating partner responses (Cano, Barterian, & Heller, 2008).

Rafaeli and Gleason (2009) developed the *skillful support framework* to help researchers and practitioners achieve greater levels and greater quality of support, with a specific focus upon intimate relationships. This model distinguishes between four important aspects of support that may explain when support is attuned to the needs of the support receiver, and hence, when support is *skillfully* provided. It assumes that by attending to the when (timing), what (content), how (process) and who (reciprocation) of support, couples can increase the benefits and reduce the costs inherent even in the most well-intended support attempts. In particular, this model states that the effectiveness of partner support is partly dependent on *timing*; i.e., when the support is provided. A second aspect involves support multidimensionality (*content*), referring to the notion that support can involve various types of emotional or practical assistance. The greatest benefit is likely to occur when there is optimal matching between the type of support provided and the type of support needed. The latter may constitute both objective needs that arise in the situation or *perceived* needs of the support recipient (i.e., what the support recipient desires; see Rafaeli & Gleason, 2009 for an overview). A third aspect involves the process or the

degree of *visibility* and *directness* of support provision, both of which may hamper support effectiveness. Visible support can elicit feelings of inadequacy, indebtedness, and inequity as well as increased and unwanted attention to the stressor in recipients. Invisible support may reduce these negative effects, although there are studies showing that both visible and invisible support were beneficial, but only if the recipient perceived his or her partner as understanding and validating (Maisel & Gable, 2009). Directive support runs the risk of demoralizing recipients. Nondirective support tends to be more effective, perhaps because it encourages and validates the recipient's view of the situation. The *reciprocation* of support, or the equity in the relationship is considered a fourth element of skillful support. In particular, giving support allows the person in pain to demonstrate competence. In doing so, attention is drawn away from one's own problem and from the imbalance in neediness; and it enables the patient to "equalize" the relationship. For instance, individuals with chronic pain may offer emotional support to their partner when he or she had a tough day at work. Being able to provide help to your partner (without chronic pain) might elicit a feeling of competence on the one hand, and show, on the other hand, that it is not always the partner with pain who is in need of help.

In sum, both the intimacy process model within the pain literature as well as the general social support literature emphasize the key adaptive role of observer support that matches the actual or perceived needs of sufferers. Yet, some important questions remain. Most notably, a *variety* of needs have been identified as being critical for adaptive outcomes. The intimacy process model of pain focuses upon the role of intimacy and closeness. The optimal matching model states that the controllability of a stressor is the key dimension on which support provision has to be matched. The skillful support framework focuses on the need for good timing and reciprocity of support. However, it remains unclear *which* needs matter most. Further, it is also not clear *why* some observers behave in ways that are not responsive to the other person's needs. Below, we will argue that Self-Determination

Theory (SDT) as well as a recently proposed affective-motivational theoretical account of interpersonal pain dynamics may help in resolving these questions.

4.   SELF-DETERMINATION THEORY

Self-Determination Theory (SDT; Deci & Ryan, 2000; Weinstein, Legate, Kumashiro, & Ryan, 2016) can be situated within the *humanistic* tradition as it starts with the assumption that humans are active, growth-oriented organisms. Human growth manifests through the engagement in interesting and personally valuable activities, the gradual development and refinement of one's capacities, and the pursuit of satisfying relationships and connection in larger social groups (Deci & Ryan, 2000). The organismic-dialectical perspective further proposes that these developmental tendencies require ongoing social nutriments and supports. As such, the social environment can either support or thwart these natural inclinations, with resulting implications for people's thriving and maladjustment (Vansteenkiste & Deci, 2003). More specifically, individuals are said to seek out activities and build up relationships that allow for the satisfaction of their psychological needs for autonomy, competence, and relatedness. This is a strong meta-theoretical (i.e., organismic-dialectical) assumption that provides the basis for generating and testing novel hypotheses. To the extent that individuals are successful in finding such need-satisfying opportunities, they may experience positive psychological outcomes (for an overview see Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013).

4.1 Three essential psychological needs

SDT posits that, just as a plant needs soil, water, and light to thrive, individuals have a set of *basic psychological needs*, the satisfaction of which are essential for individuals to grow and reach their full potential (Deci & Ryan, 2000). These needs are said to be psychological, inherent, and universal. Depending on the degree to which these needs get satisfied or

frustrated, one can reliably predict differences, both interpersonally as well as intrapersonally, in well-being, (mal)adjustment and even psychopathology (Vansteenkiste & Ryan, 2013). SDT makes an explicit distinction between the satisfaction and frustration of needs. Particularly, within intimate relationships, partners can act in either a supportive or a frustrating manner with respect to each other's needs. More specifically, a lack of need satisfaction involves being indifferent towards the partner's needs, whereas need frustration involves a more active and direct way of undermining the partner's needs (Vansteenkiste & Ryan, 2013).

As noted, SDT identifies three such basic psychological needs: the need for autonomy, competence, and relatedness (Deci & Ryan, 2000). *Autonomy* refers to the need to engage in volitional activities and fully endorse one's behaviors. *Competence* involves feeling capable, self-efficacious, and optimally challenged. *Relatedness* refers to having a sense of belonging and feeling connected to others, and is closely connected to the notion of intimacy as proposed by Cano et al. (2012). Multiple studies, across diverse domains, age groups, and cultural backgrounds have provided evidence for the benefits associated with need satisfaction and the costs associated with need frustration (see Vansteenkiste et al., 2010).

As an example, Chen et al. (2015) found, in a culturally diverse sample involving American, Belgian, Peruvian, and Chinese university students, that psychological need satisfaction was a robust predictor of participants' vitality, whereas need frustration predicted depressive symptoms. Notably, such effects even emerged for individuals attaching low importance to the satisfaction of these needs (i.e., need valuation) or who have little desire to get them met (i.e., need desire), suggesting that the benefits of need satisfaction apply regardless of differences in explicit need strength. This universality claim is empirically supported by a growing number of studies (Chen et al., 2015; Sheldon, Cheng, & Hilpert, 2011; Tay & Diener, 2011), of which some used implicit measures for need strength (e.g., Schüler, Sheldon, & Fröhlich, 2010). This hypothesis is in line with the

theoretical conceptualization of needs as necessary for psychological wellbeing rather than as socially constructed preferences. Hence, according to SDT, satisfaction of the psychological needs is the most meaningful route toward explaining variance in individuals' well-being. As these studies show, the possible moderating role of need valuation and need desire in the relation between psychological need satisfaction and wellbeing is considered minimal.

4.1.1 The role of psychological needs within romantic relationships

Our interactions with others can either support or thwart the satisfaction of our three basic needs, which in turn predicts the quality of these relationships. To date, most relationship theories rely heavily on relatedness-type needs such as perceived partner responsiveness, intimacy, or felt security, as being critical for well-being (Knee, Hadden, Porter, & Rodriguez, 2013; Knee, Porter, & Rodriguez, 2014). SDT assumes that more than satisfaction of relatedness is at stake. Specifically, when significant others (e.g., romantic partners, parents) are not supportive of one's autonomy and competence, the quality of those relationships will equally be suboptimal (Knee et al., 2014).

Apart from predicting individuals' well-being, studies have demonstrated that need satisfaction is beneficial for relationships. For example, Patrick and colleagues (2007) found that the fulfillment of each need within the context of romantic relationships uniquely predicted relationship functioning and well-being. Notably, experiences of need fulfillment in a relationship are not only predictive of one's own relationship satisfaction, but these effects also radiate to the partner's perception of their relational functioning (Patrick et al., 2007). Other studies also pointed out that both relationship-based need satisfaction and need frustration contribute to relationship satisfaction (Vanhee, Lemmens, & Verhofstadt, 2016). Vanhee and colleagues found that frustration of relational needs related to how dissatisfied partners were within their relationship, how frequently

partners initiated conflicts, and how they tried to solve these conflicts (Vanhee, Lemmens, Stas, Loeys, & Verhofstadt, 2017).

In the context of chronic pain, only a few studies have investigated the role of spousal need support, and more specifically the role of support for autonomy behavior. *Autonomy support* (AS) is characterized by the provision of choices and options, the reference to a rationale (i.e., a meaningful explanation for why a particular effort is expected), the minimizing of pressure, and the capacity to take the other's frame of reference. Examining autonomy support in the context of pain is an important topic. The pain literature has shown that significant others (e.g., romantic partners) are closely involved in the various life domains of the sufferer, such as adapting work and family life or attending doctor visits and pain treatments. Spousal autonomy support involves acknowledging the partner's perspective, providing choice, encouraging self-initiation, and being responsive to the partner (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006a). In the context of pain, a diary study conducted by Martire et al. (2013) showed that daily spousal autonomy support was associated with higher levels of daily physical activity in patients with knee osteoarthritis. In a longitudinal study among individuals with chronic musculoskeletal pain, Uysal and colleagues showed that, after a 6-months, perceived spousal autonomy support yielded a positive effect on the change in need satisfaction and well-being in patients, independent of pain intensity (Uysal, Ascigil, & Turunc, 2017). These studies indicate that perceived partner' autonomy support may be beneficial in terms of behavior change, and physical and psychological functioning. Accordingly, implementing SDT within pain research appears to offer a promising route to increasing our understanding of when observer support may contribute to improved pain outcomes.

Findings showing that autonomy support contributes to better outcomes are in line with the above described intimacy process model (Cano et al., 2012). Indeed, when spouses are autonomy-supportive and take the frame of reference of their partner, they also validate their own perspective.

By fully acknowledging the thoughts and feelings of their partner, partners are more likely to feel that they can be themselves, without having to hide or suppress certain thoughts and feelings, with their relatedness being maximized at the same time. Given the autonomy- and relatedness-enhancing character of a validating response, it is not surprising that validation has shown to be predictive for relationship intimacy and satisfaction (e.g., Laurenceau et al., 1998).

The findings on spousal autonomy support are also in line with the literature on *miscarried helping* (Coyne et al., 1988), which refers to a relational process whereby a caregiver's desire to be helpful inadvertently contributes to negative interactions that result in poorer health and adjustment. This model states that a partner's (over)investment in being a good caregiver may lead to over-monitoring of health outcomes, conflict with the patient, and blaming oneself and the patient for unimproved health. Over-involvement of close others is considered a key variable determining deleterious outcomes because caregivers' over-involvement may imply overprotectiveness, intrusiveness, and excessive helping in ways that undermine patients' sense of volition, inasmuch as they are forced to accept unwanted help or protection (Coyne & DeLongis, 1986; Fales et al., 2014). At the same time, such efforts to support the individual may cause relational distance or even conflict, and may lead patients to conclude that they are not trustworthy and, hence, incompetent to engage in tasks independently (Coyne, Wortman, & Lehman, 1988). Experiences of need frustration may, in turn, elicit feelings of resentment and anger (Chen, Soenens, Vansteenkiste, Van Petegem, & Beyers, 2016). In sum, by frustrating individuals' need for autonomy, competence and relatedness, well-intended support can be miscarried and provoke maladaptive effects (Deci & Ryan, 2000).

4.1.2 The role of psychological needs within other relationships

Supporting or thwarting someone's needs does not only matter in the context of close relationships, but also in more formal organized relationships in the health-care context. Autonomy support in a health care context requires health care professionals to acknowledge the patient's perspective, to provide choices for treatment options, to give rationales for treatment recommendations, and to minimize the patient's experience of control and pressure from the physician or from significant others in their lives (Williams, Lynch, & Glasgow, 2007).

Several studies have examined the role of autonomy support in different health contexts. These studies have shown beneficial effects for glucose control in diabetes (Williams, McGregor, Zeldman, Freedman, & Deci, 2004), weight loss and physical exercise in obese patients (Williams, Grow, Freedman, Ryan, & Deci, 1996), and less anxiety and fear for dental treatment (Halvari, Halvari, Bjornebekk, & Deci, 2012). In the domain of pain, one study has examined the effectiveness of an SDT-based intervention on physiotherapists' need-supportive communication skills (Murray et al., 2015). Attesting to the potential of SDT-based interventions, this study demonstrated that physiotherapists became more autonomy-supportive in their communications with their patients with chronic low back pain. Unfortunately, its effect upon pain outcomes was not investigated. However, promising evidence for the effectiveness of SDT-based interventions in enhancing patient's health behavior and outcomes has been garnered in other health care contexts. After 6-weekly 60-minute counseling sessions (Badr, Smith, Goldstein, Gomez, & Redd, 2015) grounded in SDT-principles, patients with lung cancer reported improvements in depression, anxiety and feelings of competence and relatedness, compared with patients who received care as usual. Moreover, caregivers of the lung cancer patients in the intervention group reported less caregiver burden and more autonomous motivation to provide care (Badr et al., 2015). Similar findings have been obtained among patients with heart failure, who were found to report greater

perceived confidence in and motivation for heart failure self-care if they had received autonomy-supportive care (i.e., the intervention group) compared with care as usual (Stamp et al., 2016). Further, a SDT-based intervention proved to be effective in increasing prolonged tobacco abstinence and lowering low-density lipoprotein-cholesterol in adults (Williams et al., 2006), and in promoting physical activity and healthy eating in overweight and obese adolescents (Fenner, Straker, Davis, & Hagger, 2013).

In sum, SDT-based interventions appear promising as they can make a difference in psychological, physiological and behavioral patient outcomes. Using SDT may be helpful because the three basic psychological needs when satisfied have the potential for enhancing the welfare of (pain) patients. Although most research in the domain of couples highlights the role of relatedness-type needs, SDT adds an important role for autonomy and competence. Most SDT-applications in health care have focused on the role of autonomy support. Nevertheless SDT states that the satisfaction of competence and relatedness is likewise crucial for inter- and intrapersonal functioning. More research is needed to investigate the role of need supportive behaviors in significant others in the domain of health care and chronic pain.

4.2 The role of different motives for support provision

Self-Determination Theory (SDT; Deci & Ryan, 2000) postulates that promoting particular types of support behavior (e.g., autonomy supportive behavior) also requires taking into account differential underlying motives that may explain *why* observers initially provide help or care. Gaining insight into different motives for providing care might also be relevant to explaining why support providers become distressed. Specifically, a large number of studies has documented that caring for others with mental or physical health problems, like chronic pain or cancer, may lead to the development of a sense of burden, distress, and burnout (Vitaliano, Zhang, & Scanlan, 2003). For example, findings demonstrate that

partners of individuals with chronic pain experience elevated levels of distress (Leonard & Cano, 2006) compared with partners of individuals without chronic pain. The levels of disability in pain patients are related to spousal relational dissatisfaction (Geisser, Cano, & Leonard, 2005) and caregiver exhaustion (Jones, Hadjistavropoulos, Janzen, & Hadjistavropoulos, 2011). Yet, it is unclear why some partners experience these challenges and others do not. SDT postulates that providing support may be driven by different motives, which may relate to the style of helping and to the enthusiasm displayed by the helper him- or herself. As a result, the help may vary in its perceived 'helpfulness', depending on its need-satisfying or need-thwarting properties.

4.2.1 Types of motivation

In SDT, different types of motivations can be distinguished and are located on a continuum ranging from highly *controlled* to highly *autonomous* (see Figure 7.2). This distinction is also important in the context of helping behavior (Weinstein & Ryan, 2010). *Controlled* motivation refers to pressure to help, which can originate either from the outside, such as the avoidance of the patient's criticism or the necessity to meet the patient's demanding expectations (i.e., *external* motivation), or from the inside, such as the avoidance of guilt feelings or the internal obligation to be loyal to the patient (i.e., *introjected* motivation). In contrast, when partners help because they perceive the helping to be personally important (i.e., *identified motivation*), and coherent with other important values (i.e., *integrated motivation*), or they help out of enjoyment and inherent satisfaction associated with the helping (i.e., *intrinsic motivation*), they are said to act for *autonomous* or volitional reasons. Yet more importantly, SDT proposes that motivations are susceptible to change. This is called *internalization* (Deci & Ryan, 2000), an active, natural process in which individuals try to transform social requests into personally endorsed values. By doing this, individuals

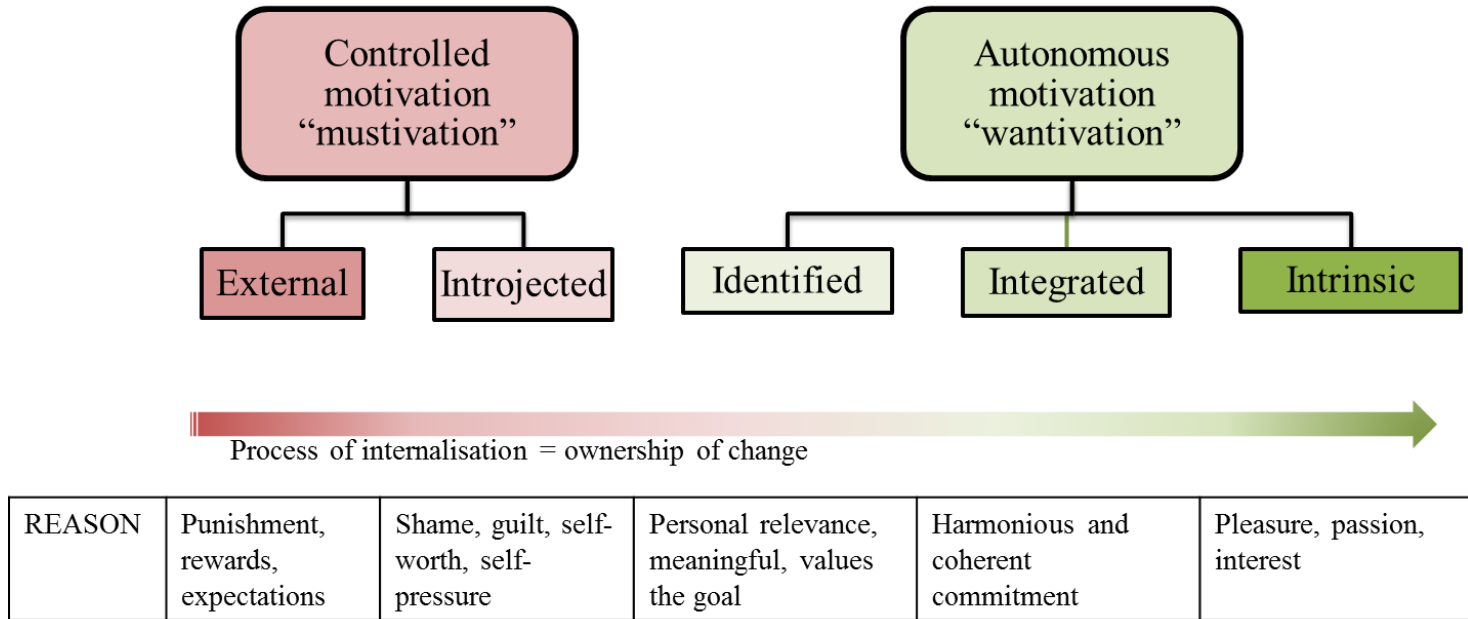| REASON	Punishment, rewards, expectations	Shame, guilt, self-worth, self-pressure	Personal relevance, meaningful, values the goal	Harmonious and coherent commitment	Pleasure, passion, interest

Figure 7.2. Different types of helping motivation according to Self-Determination Theory

gradually identify with the importance of social regulations and fully accept them as their own. When this process is hindered, regulations and values may either remain external or become only partially internalized to form *introjected* or *identified motivation*. Motives for caregiving may vary over time and most individuals tend to possess a mix of different motivations. A person's motivational profile may change from one occasion to another and in different phases of the relationship (Collins, Ford, Guichard, Kane, & Feeney, 2010).

4.2.2 Helping motives are related with caregiving burden

Care is provided because of a large variety of changing motives, and it may not be surprising that the caregiving process might induce both positive and negative feelings in the person providing the care. Generally, caring goals that are autonomously chosen are associated with higher levels of caregiver well-being as opposed to support provided because of a perceived obligation or the need for self-enhancement (Crocker & Canevello, 2008; Feeney & Collins, 2003; Kim, Carver, & Cannady, 2015; Kindt et al., 2015). Among male cancer caregivers, autonomous caregiving motives related to better mental health three years later (Kim et al., 2015). In contrast, caring driven by obligatory motives was associated with negative feelings in the support provider reflective of a strong sense of burden, whereas helping as an expression of closeness and affection was not associated with negative feelings despite being associated with greater efforts to help (e.g., Cicirelli, 1993). Similar results have been reported for patients with chronic pain as well. Kindt et al. (2015) showed that partners who were volitionally committed (i.e., displayed autonomous helping motivation) to provide help rather than experiencing it as a daunting duty (i.e., displayed controlled helping motivation) reported better wellbeing and higher relationship quality. Furthermore, findings showed that partners with more autonomous helping motives experienced less helping exhaustion. Interestingly, a subsequent diary study revealed that daily autonomous

helping motives in partners positively related to changes in partners' affective (e.g., positive affect), relational (e.g., conflict) and help-specific (e.g., exhaustion) functioning (Kindt, Vansteenkiste, Loeys, & Goubert, 2016). Taking into account different motives for providing care may provide an explanation for why some support providers become distressed and develop a "caregiving burnout".

4.2.3 Being need supportive (or not) depends on helping motives

The reasons for providing help may also impact the caregiver's attunement to another's needs and the effectiveness of the provided help. Based on SDT (Deci & Ryan, 2000), we reason that autonomous helping motivation might be associated with improved psychological need satisfaction in individuals with pain because the basic attitude of autonomously motivated caregivers is one of openness, curiosity, and sincere receptivity for the patient's preferences and needs. Such caregivers are more likely to take the frame of reference of their patients, thereby patiently attuning the timing, frequency and amount of provided help and support according to the patients' situation and needs. In contrast, on days when caregivers display more controlled motivation, they are more likely to adopt tunnel vision, thereby placing their own standards, own goals, and own agenda more centrally (Kindt et al., 2016). As a result, caregivers will respond in a more restrictive, less responsive way, thereby missing opportunities to nurture the patient's psychological needs. This assumption is in line with a recently proposed affective-motivational theoretical account of interpersonal dynamics in the context of pain (Vervoort & Trost, 2017; further discussed below). This model states that individuals with high self-oriented goals, rather than other-oriented goals, when faced with another in pain, may become less sensitive to feedback when faced with another in pain. The reduced feedback sensitivity may impede the receptivity or attention to the needs of the person in pain, potentially contributing to rigid or inflexible caregiving behavior.

This pattern is indeed what studies have shown. Greater autonomy in helping others is not only associated with increased closeness and well-being in helpers themselves (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006b; Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002; Patrick et al., 2007; Weinstein & Ryan, 2010), but it also benefits the recipients of help (Gagné, 2003; Weinstein & Ryan, 2010). These findings have been replicated in patients with chronic pain as well. Kindt et al. (2015) showed that partners' autonomous, relative to controlled helping motives contributed to a better relational functioning of patients, but only for those with high levels of pain. In a subsequent multi-informant 14-day diary study, this moderation of pain intensity was not replicated (Kindt et al., 2016). Daily autonomous helping motivation contributed to patient outcomes (e.g., affect, relational conflict, perceived amount of and satisfaction with help, and disability) regardless of experienced pain that day. Notwithstanding, daily pain clearly was as an important predictor of patients' daily functioning. Further, findings of both studies revealed that these benefits occurred because autonomous and controlled motivation differentially contributed to the satisfaction of the three universal psychological needs of autonomy, competence and relatedness. More specifically, when partners were volitionally committed to providing help, rather than feeling pressured to do so, both partners and patients reported higher relationship-based needs satisfaction. Additionally, findings indicated that fluctuations in patients' daily needs satisfaction and frustration explained why partners' helping motives were related with patients' daily functioning (Kindt et al., 2016).

The reported findings clearly attest to the notion that helping motives should be taken into account when trying to understand when helping responses are more or less attuned to the needs of the person suffering from pain. Provided that motives for offering help and the associated emotions are related to the goals that caregivers pursue, it follows that understanding which goals caregivers have as well as how caregivers regulate these goals is paramount These ideas are well articulated by the

affective-motivational account of interpersonal dynamics in the context of pain (Vervoort & Trost, 2017).

4.2.4 Helping motives depend on observer goal and emotion regulation

The *affective-motivational model of interpersonal pain dynamics* (Vervoort & Trost, 2017) posits that pain touches on a fundamental tension between the goals we hold for the other person in pain (i.e., other-oriented goals) and the goals we hold for ourselves (i.e., self-oriented goals). The prioritization of self- versus other-oriented goals is hypothesized to instigate different emotional and motivational processes that impact the nature and effectiveness of observer behavioral responses to sufferers' pain. More specifically, preferential attunement to *self-oriented goals* will likely result in self-focused emotional states (i.e., often denoted as personal distress). These will in turn prioritize *avoidance motives* (movement away from the person in pain and their respective needs) and drive behavior toward one's own needs. In contrast, attunement to *other-oriented goals* will promote other-oriented emotional states (often denoted as sympathy), prioritizing *approach motives* (towards persons in pain and their needs) and promoting behaviors responsive to the needs of another person (Elliot, Eder, & Harmon-Jones, 2013; Gable & Gosnell, 2013). The two types of (conflicting) goals that caregivers can have differ in the extent to which they focus on the satisfaction of caregivers' own needs or the needs of the recipient of care. Vervoort & Trost (2017) argue that both self- and other-oriented goals and associated motives/emotional states might underlie ostensibly similar caregiving behavior. For instance, when your partner is in pain you can provide some medication (a pain control behavior) or you can distract your partner with humor (behavior not focused on pain control). However, both caregiving behaviors might originate from a self-oriented goal, prioritizing avoidance motives (e.g., feeling uncomfortable in the presence of your partner's suffering or wishing to return to a personal work assignment) or from an other-oriented goal, prioritizing approach motives (e.g., quickly ease your partner's suffering or encourage your partner to

engage in his/her daily activities), thereby differentially impacting on the needs of the person suffering from pain.

Caregiving is hypothesized to have a different impact upon individuals' pain outcomes because the underlying mechanisms that play a role in self or other-oriented caregiving behavior differ. As such, this model coincides with SDT (Deci & Ryan, 2000). More specifically, autonomous, instead of controlled, helping motives are expected to predict the most beneficial outcomes because this type of helping is better attuned to the needs of the person in pain who is receiving the support (e.g., Kindt et al., 2016). Future research could investigate whether controlled helping motives, as defined within SDT, are related with having more self-oriented goals, whereas more autonomous helping motives are in line with more frequent other-oriented goals.

Vervoort & Trost (2017) further suggest at least two mechanisms that may affect the nature and effectiveness of caregiving, depending upon whether caregiving is driven by self- or other-oriented goals and associated motives and emotions. The first mechanism is the *quality of the caregiving response*, reflected in such non-verbal characteristics as tone of voice, interpersonal distance, touch/physical contact, and facial expression. For example, self-oriented emotions and avoidance motives may reveal a less sincere tone in which a similar message is communicated when trying to reassure someone. This mechanism is also in line with findings, based on SDT (Deci & Ryan, 2000), showing that autonomous or volitional helping motives, relative to controlled or pressured ones, are related to a better quality of the helping behavior (i.e., patients are more satisfied with the received help, their psychological needs are more satisfied; Kindt et al., 2016) and they feel closer to the helper (Weinstein & Ryan, 2010).

A second mechanism may be caregivers' *sensitivity to feedback cues* as provided by the person suffering from pain. For instance, self-oriented emotion and avoidance motives may impede observer receptivity or attention to sufferer feedback, potentially contributing to rigid/inflexible caregiving

behavior instead of flexible caregiving behavior, which is hypothesized to originate from other-oriented emotion and approach motives. This idea is also in line with SDT, assuming that controlled motivation in the helping process is conducive to a tunnel vision wherein one's own needs are prioritized instead of being receptive to the needs of the help recipient.

It then follows that the regulation of goals and associated emotions is key to promoting the right balance between self- versus other-oriented emotions and goals. When other-oriented emotions and goals prevail over self-oriented ones, this pattern tends to facilitate optimal caregiving and pain outcomes. Emotion regulation processes may target cognition, action tendencies, somatic responses, expressive behavior, and/or subjective feelings comprising pain-related emotions. Reappraisal (e.g., reinterpreting the meaning of a particular goal) and attentional deployment (e.g., engagement versus distraction) strategies are empirically well supported (Webb, Miles, & Sheeran, 2012). However, more research about emotion regulation processes in the interpersonal context of pain is warranted.

5. CONCLUSIONS

Pain is not only a private experience but also an interpersonal one. Pain affects others in various ways. Others' responses, in turn, further shape sufferers' pain experience and behaviors. Especially close relationships, such as parent-child relationships and intimate relationships, are challenged by the need to deal with pain. Chronic pain couples face unique difficulties of experiencing a long-term chronic illness which often requires more intensive caregiving, but also experience problems that are common to all relationships (e.g., child rearing, finances, work-issues, etc.).

Various attempts have been made to classify observer behavioral responses in terms of their expected impact upon the experience and actions of an individual with pain. In this chapter, we discussed the operant framework, originally formulated by Fordyce (1976), which has received considerable attention in the pain literature. Although the introduction of the

operant framework definitely made important contributions regarding the critical role of observer behavior in understanding sufferers' pain outcomes, it has fallen short in capturing the of interpersonal dynamics unfolding in the context of pain. One problem with the operant framework is that research is often based on a priori assumptions about the reinforcement value of an observer response, instead of reflecting the actual reinforcing consequence. Likewise, evidence has shown that observer punishing responses, such as expressing irritation or ignoring the patient, are not always an adequate strategy to diminish pain behavior (Flor, Kerns, et al., 1987). It has become increasingly clear that any given type of behavioral response cannot, in and of itself, be considered adaptive or maladaptive (e.g., Bolger & Eckenrode, 1991; Bolger, Foster, Vinokur, & Ng, 1996; Bolger, Zuckerman, & Kessler, 2000).

We have argued that need-based approaches, such as the intimacy model applied to pain, as well as the general social support literature may prove valuable in understanding why observers' behavioral responses may differentially impact patient behavior and pain-related outcomes; i.e., behavioral responses might be considered supportive/helpful depending upon the extent to which these responses meet the needs of the person in pain (Deci & Ryan, 2000; Rafaeli & Gleason, 2009). Self Determination Theory (SDT) defines a set of basic psychological needs that are considered essential for one's well-being, i.e., the need for autonomy (i.e., to volitionally engage in activities), competence (i.e., to feel self-efficacious) and relatedness (i.e., feeling close to others), that can be satisfied (or not) during caregiving interactions. Drawing upon SDT as well as an affective-motivational account of interpersonal dynamics in pain (Vervoort & Trost, 2017), we described why observers may not always behave in ways that are responsive to the other person's needs. We highlighted that observers' goals and associated motives and emotional states are likely to be critical in this regard. Emotion regulatory strategies are important in creating a balance between the different types of goals and emotions (self-oriented versus

other-oriented). Accordingly, goal and emotion regulation processes constitute a critical target for future research and treatment as they may facilitate caregiving behaviors that are increasingly attuned to the needs of the sufferer in pain, thereby enhancing adjustment for the person in pain.

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WHEN IS HELPING YOUR PARTNER WITH CHRONIC PAIN A BURDEN? THE RELATION BETWEEN HELPING MOTIVATION AND PERSONAL AND RELATIONAL FUNCTIONING[1]

Objective: Self-Determination Theory (SDT) may be a useful framework to understand why chronic pain affects partners. SDT postulates that individuals can engage in helping behaviors for different motives varying from more autonomous or volitional motives to more controlled or pressured motives. This article examines the relationship between partners' type of motivation to help (i.e., autonomous vs. controlled) and their personal and relational functioning. Furthermore, mechanisms underlying this relationship (i.e., helping exhaustion and relationship-based need satisfaction) were examined.

Methods: In a sample of 48 couples, of which one partner had chronic pain (36 female patients), questionnaires measuring life satisfaction, positive and negative affect, anxiety and depressive feelings, relationship quality and relationship-based need satisfaction were filled out. Individuals with chronic pain (ICPs) also reported on pain intensity and disability whereas partners were requested to report on motives for helping and helping exhaustion.

Results: Data analysis with Structural Equation Modeling revealed that autonomous, relative to controlled, motives for helping among partners related positively to partners' well-being and relationship quality, and negatively to distress. The experience of helping exhaustion and relationship-based need satisfaction mediated these associations. Moreover, partners' autonomous helping motivation related positively to patient-reported relationship quality among ICPs high in pain intensity.

Conclusions: Applying Self-Determination Theory in a context of pain provides new insights into why chronic pain affects partners and how partners impact patient outcome. Directions for future research are outlined.

INTRODUCTION

Pain is known to elicit suffering among individuals with chronic pain (ICPs). However, also partners of ICPs may report elevated distress (Leonard & Cano, 2006), relational dissatisfaction (Geisser, Cano, & Leonard, 2005) and caregiver exhaustion (Jones, Hadjistavropoulos, Janzen, & Hadjistavropoulos, 2011). Yet, it is unclear why some partners experience these challenges and others do not. As partners may be a primary source of social support for ICPs who struggle daily with pain, it may be relevant to consider *why* partners provide help (Goubert, 2015). Within the present study, Self-Determination Theory (SDT) (Deci & Ryan, 2000) is adopted to examine the relation between partners' type of helping motivation and both ICPs' and partners' personal and relational functioning.

SDT is a broad theoretical framework for the study of human motivation and personality. Within this theory, different types of motivation can be located on a continuum ranging from highly controlling to highly autonomous (Deci & Ryan, 2000). The distinction between *autonomous* and *controlled* motivation is also relevant in the context of helping behavior (Weinstein & Ryan, 2010). When partners help out of enjoyment and inherent satisfaction associated with the helping or because they perceive the helping to be personally important, they are said to act for *autonomous* or volitional reasons. In contrast, *controlled* motivation refers to pressure to help, which can originate either from the outside, such as the avoidance of the ICP's criticism or the necessity to meet the ICP's demanding expectations, or from the inside, such as the avoidance of guilt feelings or the internal obligation to be loyal vis-à-vis the ICP. Abundant research in a variety of life domains has found autonomous motivation to yield manifold benefits, including greater activity engagement, better maintained behavioral persistence, enhanced well-being and better relational functioning (Ryan & Deci, 2000; Vansteenkiste, Niemiec, & Soenens, 2010).

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These benefits presumably occur because autonomous and controlled motivation differentially contribute to the satisfaction of three universal psychological needs, which must be satisfied for effective human functioning (Deci & Ryan, 2000). These basic psychological needs are the following: (a) the need for competence (referring to feeling effective in carrying out activities), (b) the need for autonomy (denoting experience of choice and psychological freedom), and (c) the need for relatedness (referring to the experience of intimacy and warmth). Need satisfaction does not only account for personal well-being benefits associated with autonomous functioning (e.g., Sheldon & Elliot, 1999) but may also contribute to better relationship quality (Patrick, Knee, Canevello, & Lonsbary, 2007). Autonomous motivation to help may further yield well-being benefits for partners because it may buffer against emotional exhaustion (Lyonette & Yardley, 2003; Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012).

A few studies have already investigated the motivation underlying helping behavior from an SDT-perspective. Ryan and Connell (Ryan et al., 1989) showed that more autonomous motives underlying elementary school children's prosocial behavior related to greater empathy and greater relatedness with parents and teachers. Subsequent work among adult volunteers showed more autonomous motives for volunteering to relate to greater volunteering satisfaction, lower intention to quit volunteer work (Millette & Gagné, 2008) and greater effort-expenditure (Bidee et al., 2013). On a clinical level, autonomous motives for giving care to one's spouse with cancer have been found to predict less depressive symptoms and more experienced benefits after care provision among the caregiving spouses (Kim, Carver, Deci, & Kasser, 2008). Furthermore, the well-being benefits of autonomous motives for prosocial behavior (in healthy participants) have been found to radiate towards the recipients of help, who also experienced greater relatedness need satisfaction (Weinstein & Ryan, 2010).

In the present study in partners of ICPs, we hypothesized that (1) partners' autonomous, relative to their controlled, helping motivation would be associated with higher levels of personal well-being and relationship quality, while being negatively related to their psychological distress. (2) Second, we expected partners' reduced helping exhaustion and higher relationship-based need satisfaction to account for these effects. Furthermore, we expected (3) autonomous, relative to controlled, helping motivation to be associated with the ICPs' experienced disability, personal well-being, psychological distress and relationship quality, in particular among those in high need for help to deal with the pain, i.e. those high in pain intensity and (4) that these effects can be explained by a higher relatedness need satisfaction in ICPs, as helping for autonomous reasons may promote closeness (Piliavin & Siegl, 2007; Weinstein & Ryan, 2010).

METHOD

Participants

Participants were 48 couples, recruited through the Flemish Pain League, an umbrella organization for individuals suffering from chronic pain. In December 2010, members of the Flemish Pain League (about 3000) received an invitation letter to participate in studies about chronic pain and quality of life in our lab (see figure 1). About 10% ($N = 315$) agreed to be contacted by phone. Of those, 244 ICPs were contacted, 189 were reached by phone and 110 met the inclusion criteria. Eighty-seven couples (79.1%) agreed to participate. Inclusion criteria for participation of ICPs in the present study were (1) having chronic pain for at least 3 months, (2) living together with a partner for at least one year, (3) being between 18 and 65 years, and (4) being sufficiently proficient in Dutch. The predominant reasons for non-participation ($N = 23$) were no interest in the study, personal problems, or lack of time. Of the 87 couples who agreed, 62 ICPs and 51 partners fully completed the questionnaires, resulting in complete data for 48

dyads. Questionnaire data were incomplete for 28 couples (35.9%) and missing for 11 couples (12.6%).
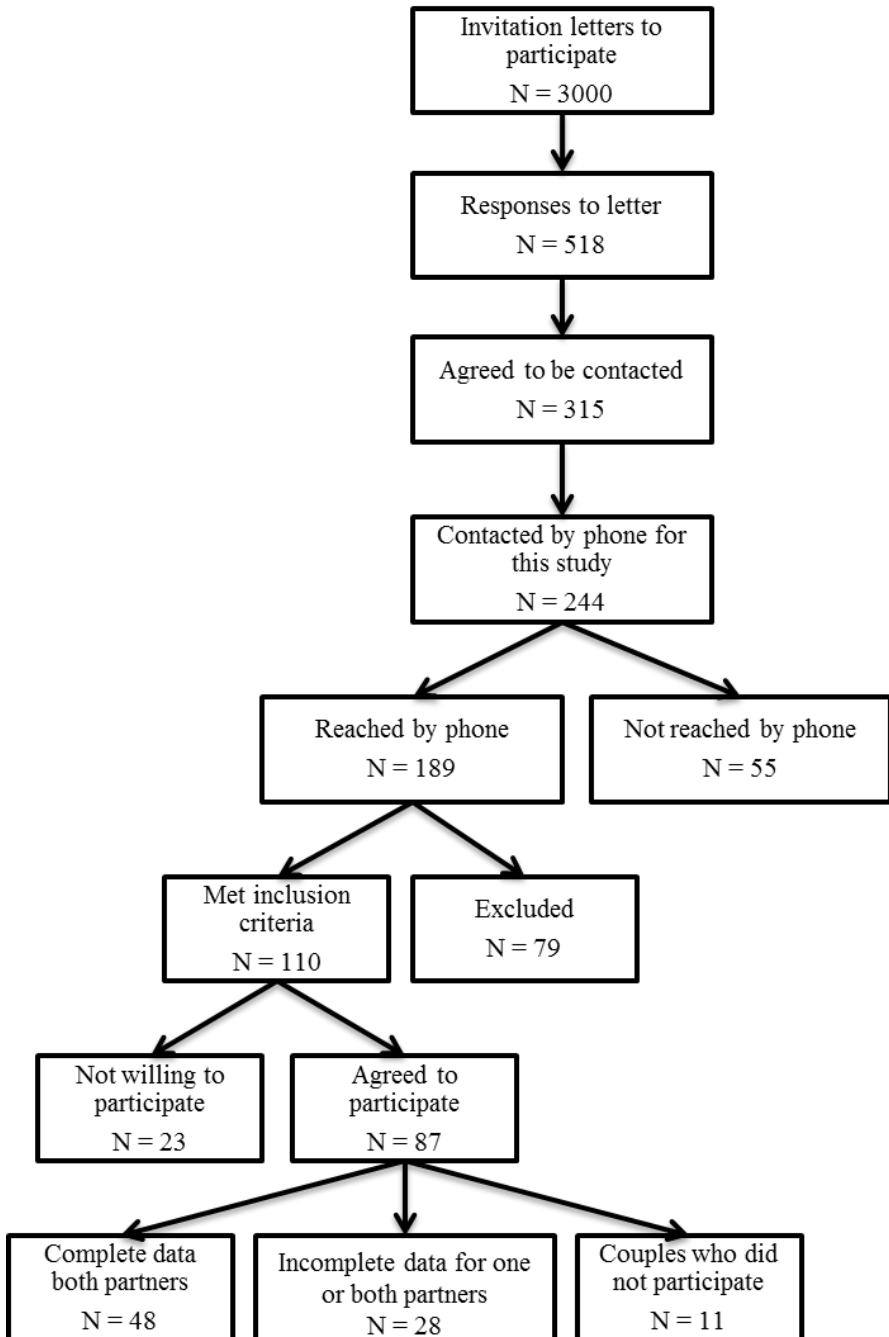
Figure 1. Flowchart of how final sample size was obtained.

In our final sample ($N = 48$ dyads), ICPs were predominantly female ($N = 36$ female ICPs). The mean age of ICPs was 53.0 years ($SD = 7.6$; range: 25-64 years) and for partners it was 53.9 years ($SD = 7.0$; range: 31-67 years). All couples were Caucasian and most of them were heterosexual ($N = 46$). The majority was married or legally cohabiting (85.4%), for which the mean duration of the relationship status was 24.6 years ($SD = 11.4$; range: 0.2-43.0 years). Except for one partner with a Dutch nationality, all ICPs and partners were Belgian. Most ICPs were living off a disability allowance (62.5%). Almost half of them had followed higher education beyond the age of 18 (45.8%). More than half of the partners were working (60.4%) and 41.7% had followed higher education. No socio-demographic information was available for non-responders to the invitation letter. The most commonly reported pain condition in ICPs was fibromyalgia[2] ($N = 17$, 35.41%), followed by neuropathic pain ($N = 14$, 29.17%) with mainly sciatic complaints, and nociceptive musculoskeletal pain ($N = 13$, 27.08%), which included osteoarthritis, spinal fracture, trauma, congenital disorder and inflammatory disease. Some ICPs reported having failed back surgery syndrome ($N = 8$, 16.67%). Participants were allowed to report multiple conditions, which made the sum of all the conditions greater than 100%. Three ICPs did not provide any information regarding their diagnosis.

Questionnaires

ICP's pain intensity and disability were assessed with the Graded Chronic Pain Scale (GCPS) (von Pückler, 2013). A pain intensity score was calculated by averaging three ratings for pain intensity (current pain, average pain, and worst pain in the past six months) each on a scale from '0' (no pain) to '10' (worst imaginable pain). A disability score was computed by calculating the mean score out of three items about pain interference with activities during the last six months (daily activities; recreational, social and

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[2] Some consider fibromyalgia as neuropathic pain (Koroschetz et al., 2011)

family activities; work or household activities), which were also rated on a scale from '0' (no interference) to '10' (impossible to carry out activity). The GCPS has shown to be a reliable and valid measure of severity of chronic pain (Von Korff, Ormel, Keefe, & Dworkin, 1992). In the present study, Cronbach's alphas were .66 for pain intensity and .89 for disability.

The Satisfaction With Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985) was used to assess general life satisfaction in both partners. This scale consists of 5 items (e.g., "In most ways my life is close to my ideal") that are rated using a 7-point scale ranging from '1' (not at all) to '7' (extremely). The SWLS is widely used and validated. Cronbach's alphas in the present study were .82 and .91 for ICPs and partners, respectively.

The Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) measured positive (10 items; e.g., enthusiastic) and negative affect (10 items; e.g., upset) in both partners. Each of the 20 items was rated on a 5-point scale ranging from '1' (very slightly) to '5' (extremely) to indicate the extent to which the affect is experienced in general. Cronbach's alphas in the current study were .91 and .93 for positive affect and .91 and .90 for negative affect for ICPs and partners respectively.

Psychological distress was measured in both partners by using the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) and consists of 14 items, seven of which screen for anxiety symptoms (e.g., "Do you worry a lot?") and seven for depressive symptoms (e.g., "Do you feel optimistic about the future?"). Items are rated on a 4-point scale representing the degree of distress experienced during the previous week. The HADS has proven to be reliable and valid as a screening instrument in adults with or without a medical condition (Zigmond & Snaith, 1983). A higher total score indicates more general distress (Norton, Cosco, Doyle, Done, & Sacker, 2013). In the present study, Cronbach's alphas were .90 and .94 for total scores of ICPs and partners, respectively.

Relationship quality was assessed with the 32-item Dyadic Adjustment Scale (DAS) (Spanier, 1976), which provides a global measure

of relational adjustment. The DAS consists of four subscales. Dyadic satisfaction (10 items) measures the tension between partners and the extent to which ending the relationship has been considered. The extent of agreement between partners is called dyadic consensus (13 items). Dyadic cohesion (5 items) assesses shared interests and activities, and affectional expression (4 items) reflects the satisfaction with affection and sex in the relationship. Higher sum scores represent higher levels of relationship quality. Heene et al.(Heene, Buysse, & Van Oost, 2000) confirmed reliability and validity of the overall scale. In this study, Cronbach's alphas were .94 for ICPs and .93 for partners.

To measure partners' helping motivation, we used an adapted version of the Motivation to Help Scale (MHS) (Weinstein & Ryan, 2010). Partners received a list of 20 reasons (instead of an original set of 11 items) for helping or supporting their partner in pain. They reported on how true these motives for helping were for them on a 7-point scale ranging from '1' (not at all true) to '7' (totally true). Drawing from SDT, four different types of motivation were distinguished: external motivation (5 items, e.g., "because my partner would criticize me"), introjected motivation (5 items, e.g., "because I would feel guilty if I didn't help"), identified motivation (5 items, e.g., "because I think it is important to help my partner") and intrinsic motivation (5 items, e.g., "because I enjoy helping my partner"). Items of external and introjected motivation were summed up to represent controlled motivation to help, whereas items of identified and intrinsic motivation were summed to represent autonomous motivation to help. Cronbach's alpha was .75 for controlled motivation and .89 for autonomous motivation. In line with Weinstein and Ryan (Weinstein & Ryan, 2010), an overall index reflecting the *relative* degree of autonomous helping motivation was calculated by subtracting controlled motivation from autonomous motivation scores. A variety of studies have shown that the observed effects of an overall measure can be carried by the effects underlying both autonomous

and controlled functioning (e.g., Vansteenkiste, Zhou, Lens, & Soenens, 2005).

Helping exhaustion in partners was assessed by means of an adapted version of the exhaustion subscale of the Maslach Burnout Inventory General Survey by applying the items to a help context (Schaufeli & Van Dierendonck, 2000). Three components have been distinguished in job burnout: exhaustion, cynicism and reduced efficacy, of which the first one is the most obvious manifestation of burnout (Maslach, Schaufeli, & Leiter, 2001). Partners were requested to rate on a 7-point scale the extent to which they agreed with five items (e.g., "In the evening, I often feel exhausted by the efforts to help my partner"). Higher scores reflect higher levels of exhaustion. Cronbach's alpha was .86.

Need satisfaction within a relational context was measured in both partners by an adapted version of the Need Satisfaction Scale (Guardia, Ryan, Couchman, & Deci, 2000). Compared with the original scale, which consists of 9 items, three additional reverse scored items were added in our version to attain a balanced measure of need satisfaction and frustration. This scale measures the degree to which partners feel supported by their partner in the fulfillment of their basic psychological needs. Similar to the original version, three subscales can be distinguished: autonomy satisfaction (e.g., "When I am with my partner, I feel free to be who I am"), competence satisfaction (e.g., "When I am with my partner, I feel competent") and relatedness satisfaction (e.g., "When I am with my partner, I feel loved"). A total of 12 items (4 items for each of the three needs) were rated on a 7-point scale from '0' (totally disagree) to '7' (totally agree). Cronbach's alpha was .58 and .65 for autonomy, .74 and .71 for competence, .77 and .71 for relatedness for ICPs and partners, respectively. An overall score was created by averaging the three separate need scales, which yielded an alpha of .88 for both ICPs and partners.

Procedure

Members of the Flemish Pain League were contacted by telephone upon agreement to (1) provide more information about this study and (2) assess inclusion criteria. If both partners in a couple reported having chronic pain ($N = 14$)[3], the individual with the longest pain duration was chosen as the ICP. Only if both partners were willing to participate, an email was sent to them with the link to the online questionnaires and a personalized code to log in. Eight of the 48 couples had no access to the internet or were not able to work with it. Paper and pencil questionnaires for those couples were sent by regular mail with a pre-paid envelope enclosed. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Data analytic strategy

Structural Equation Modeling (SEM) was conducted in R (version 3.0.1) with the *lavaan* package (Rosseel, 2012). SEM is one of the most commonly used data-analytic techniques for dyadic data (D. a Kenny, Kashy, & Cook, 2006). For each of the hypotheses a SEM model was created[4]. To evaluate model fit, the X²-test statistic, the comparative fit index

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[3] Preliminary analyses showed that there were significant differences between pain characteristics of ICPs and partners who also reported having chronic pain. Considering the small sample of dyads ($N=14$) the Wilcoxon Rank Sum test for paired samples was used. ICPs, when compared to their partners, reported a higher pain duration in months ($M_{ICP} = 160.9$, $SD = 89.8$ versus $M_{partner} = 97.8$, $SD = 125.8$; $W = 74$, $p = .05$), more disability ($M_{ICP} = 7.30$, $SD = 1.51$ versus $M_{partner} = 2.7$, $SD = 2.16$; $W=102$, $p<0.01$) and more pain intensity ($M_{ICP} = 7.2$, $SD = 1.1$ versus $M_{partner} = 4.5$, $SD = 1.6$; $W = 100$, $p<0.01$). Next, an independent samples t-test showed that there was no difference in relative autonomous helping motivation of partners with, compared to those without, chronic pain ($t(46) = -.79$, $p=.43$). Based on these analyses, we decided to not further control for the presence of chronic pain in partners.

[4] Two-hundred observations or a ratio of sample size to the number of free parameters equal to 5 are often seen as a goal for SEM research, however, these rules-of thumbs are outdated. Sample size requirements have to be model-specific by taking into account the number of indicators and factors, the magnitude of factor loadings and path coefficients, and the amount of missing data (Wolf, Harrington, Clark, & Miller, 2013). Also, the performance of SEM heavily depends on the complexity of the proposed model (D. A. Kenny & McCoach, 2003). To evaluate

(CFI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) were used. A model was considered good when the X²-test was not significant, when CFI values were greater than .95, when RMSEA values were close to .06 and when SRMR values were around .08 or below (Hu & Bentler, 1999; Kline, 2010). For comparing two nested models we used the χ2 difference test. To compute this test, the difference of the two χ2 values of the models in question is calculated as well as the difference in the degrees of freedom. When the test is significant, it means that the model with a new parameter (i.e. the largest model with most freely estimated parameters) fits the data better than the smaller and previously estimated model. When the test is not significant, both models fit equally well, which means that the extra parameter in question can be eliminated from the model and the more parsimonious model is to be preferred. In all models with partner outcomes, age and gender of the partner were entered as control variables. For models with ICP outcomes we entered age and gender of the ICP. Helping motivation and pain intensity were centered and an interaction term was created and added in order to examine moderation effects. Robustness of results against violations of the multivariate normality assumption was assessed using the Satorra-Bentler correction. In each model, standardized path coefficients were reported. Personal well-being was used as a latent variable with life satisfaction and positive and negative affect as indicators, since there is a general agreement that for measuring personal well-being both life evaluations and measures of affect need to be included. We did not use psychological distress as a fourth indicator of personal well-being, but included it as a separate outcome measure, for which we used the total score of the HADS. Separate from personal well-

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the performance of the fit indices and the stability of the estimated effects in our setting, we mimicked through simulations the data structure observed in this study and repeatedly draw samples of size 48 from the observed multivariate normal distribution. This simulation study revealed appropriate performance of the SEM-approach in this setting. For evaluating a test of fit, it is recommended to use at least two different classes of goodness-of-fit statistics (Hu & Bentler, 1999).

being, relationship quality was added as a final outcome variable by using the total score of the DAS. When mediation coefficients were tested, bootstrapped standard error estimates, using 1000 draws, were computed (Bollen & Stine, 1990).

RESULTS

Descriptive statistics

In this sample ICPs reported on average 160.94 months of pain (SD = 89.81). The mean pain intensity score on a Likert scale ranging from 0 to 10 was 7.30 (SD = 1.51) and the average disability in ICPs was 7.23 (SD = 1.09). Paired samples t-tests were conducted to examine whether outcome variables and relationship-based need satisfaction were significantly different between the two partners. ICPs only reported less life satisfaction (M_{ICP} = 10.40, SD = 6.57; $M_{partner}$ = 17.67, SD = 7.12; $t(49)$ = -6.63, $p<.001$) and less positive affect (M_{ICP} = 10.40, SD = 6.57; $M_{partner}$ = 17.67, SD = 7.12; $t(49)$ = -2.79, $p<.01$) than their partners. For negative affect, ICPs (M = 21.73, SD = 8.17) did not differ from their partners (M = 19.35, SD = 7.70). Also for anxiety symptoms (M = 8.21, SD = 4.52; M = 7.33, SD = 4.45) and depression symptoms (M = 7.60, SD = 4.49; M = 6.13, SD = 4.56) mean scores were not significantly different between ICPs and partners. For relationship quality (DAS) (Spanier, 1976) total scores less than 100 are commonly used as a cut point for poor relationship quality. As for ICPs (M = 115.01, SD = 19.15), 10 had a score below 100, while 11 partners had a score below 100 (M = 112.30, SD = 17.89). Also for this outcome measure, mean scores were not significantly different between ICPs and partners, as for overall relationship-based need satisfaction and autonomy, competence and relatedness need satisfaction ($p>.05$).

Correlations

Table 1 provides within-couple correlations along the diagonal as well as correlations between all measured variables for ICPs (below the

diagonal) and for partners (above the diagonal). In line with our expectations, partners' relative autonomous helping motivation was significantly and positively related to partners' well-being, relationship quality, and relationship-based need satisfaction, while being negatively related to partners' distress and helping exhaustion. Also, overall relationship-based need satisfaction in partners was positively associated with their personal well-being, relationship quality, and negatively associated with psychological distress. With regard to partners' helping exhaustion, significantly negative correlations were found with personal well-being and relationship quality and positive correlations with psychological distress. Partners' relative autonomous helping motivation was, however, not related to any of the measures reported by the ICP, except for a positive association with ICPs' relatedness need satisfaction. ICPs' relatedness satisfaction was also significantly negatively related to negative affect and psychological distress, while being positively related to relationship quality in ICPs.

Within-couple correlations revealed significant associations between both partners' life satisfaction, psychological distress and relationship quality, as well as between their level of overall need satisfaction and the three separate need measures. Only positive and negative affect were not significantly correlated within the couple.

Measurement model

Before testing a structural model, an initial test of the measurement model was conducted for partners and ICPs simultaneously. We used a confirmatory factor analysis to examine whether the three indicators for personal well-being (life satisfaction, positive and negative affect) provided a good fit. Results showed an acceptable fit ($\chi^2(8) = 10.86$, $p = .21$, CFI = .97, RMSEA = .08 and SRMR = .08). The first factor loading (life satisfaction) was fixed to 1, the loadings of positive and negative affect on

Table 1. Correlations among Measured Variables in Individuals with Chronic Pain (below diagonal) and Partners (above the diagonal)

				Outcome measures					Mediators				
		1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Relative autonomous helping motivation[A]	-	-	-	.40**	.43**	-.42**	-.41**	.44**	.65**	.56**	.59**	.60**	-.68**
2.	Pain Intensity[B]	-.10	-	-	-	-	-	-	-	-	-	-	-	-
3.	Disability[B]	-.09	.65**	-	-	-	-	-	-	-	-	-	-	-
4.	Life Satisfaction	.20	-.23	-.21	*.39**	.58**	-.66**	-.63**	.38*	.46**	.36*	.50**	.37*	-.53**
5.	Positive Affect	-.05	-.20	-.19	.42**	*.15*	-.67**	-.68**	.34*	.47*	.25	.62**	.36*	-.61**
6.	Negative Affect	-.06	.25	.19	-.40**	-.71**	*.23*	.83**	-.56**	-.54**	-.37**	-.57**	-.49**	.63**
7.	Psychological distress	.03	.12	.19	-.46**	-.70**	.78**	*.29**	-.41**	-.53**	-.34*	-.59**	-.49**	.64**
8.	Relationship quality	.15	-.20	-.17	.21	.03	-.29*	-.15	*.35**	.68**	.65*	.54*	.64**	-.46**
9.	Overall need satisfaction	.21	-.13	-.13	.21	.21	-.41**	-.27	.76**	*.46***	.90**	.89**	.90**	-.56**
10.	Autonomy satisfaction	.23	-.15	-.15	.17	.02	-.23	-.11	.72**	.87**	*.33**	.69**	.74**	-.40**
11.	Competence satisfaction	.03	-.06	-.06	.15	.33*	-.42**	-.28	.52**	.87**	.61**	*.36**	.69**	-.57**
12.	Relatedness satisfaction	.30*	-.12	-.12	.23	.20	-.42**	-.30*	.77**	.90**	.70**	.65**	*.45***	-.53**
13.	Helping exhaustion[A]	-	-	-	-	-	-	-	-	-.56**	-.40**	-.57**	-.53**	-

Note. Values along the diagonal (bold and italic) represent within-couple correlations. [A] Variables only assessed among partners; [B] Variables only assessed among ICPs. *p<0.05, **p<0.01

personal well-being as latent variable were statistically significant for both partner and ICP variables ($p<0.01$).

Hypothesis 1: Helping motivation and partner outcomes

To determine whether partners' helping motivation was a significant predictor of partners' personal well-being, distress, and relationship quality, a SEM model was tested. The model fit was good: $\chi^2(10) = 9.82$, $p = .46$, CFI = 1.00, RMSEA = .00 and SRMR = .04. Results indicated that there was a positive contribution of relative autonomous helping motivation to personal well-being ($\beta = .50$, $SE = .06$, $p < .01$) and relationship quality ($\beta = .45$, $SE = .19$, $p < .01$), while being negatively related to psychological distress ($\beta = -.45$, $SE = .09$, $p < .01$). No main effects were found for partners' age and gender.

Hypothesis 2: Helping exhaustion and relationship-based need satisfaction as mediators

A second SEM model was constructed to test whether partners' helping exhaustion would function as a mediator of the relationship between relative autonomous helping motivation and partner outcomes. The mediation model provided a good fit to the data: $\chi^2(17) = 16.60$, $p = .48$, CFI = 1.00, RMSEA = .00, SRMR = .06. Greater relative autonomous helping motivation in partners was associated with less helping exhaustion ($\beta = -.68$, $SE = .06$, $p < .001$). In turn, helping exhaustion was negatively associated with partners' well-being ($\beta = -.71$, $SE = .11$, $p < .001$), relationship quality ($\beta = -.44$, $SE = .39$, $p < .01$) and positively associated with psychological distress ($\beta = .64$, $SE = .18$, $p < .001$). Next, the same model was tested, this time allowing a direct path between relative autonomous helping motivation and outcomes. This model also provided a good fit ($\chi^2(14) = 14.99$, $p = .38$, CFI = .99, RMSEA = .04, SRMR = .06). The χ^2 difference test, used for comparing two nested models, indicated that this direct effect model was not significantly better than the previous one ($\chi^2_{diff}(3) = 1.88$, $p = .60$).

Furthermore, helping motivation was no longer associated with the three different partner outcomes ($p > 0.05$), which means that helping exhaustion completely mediated the relationship between relative autonomous helping motivation and the three outcome variables in partners.

Finally, we examined whether partners' overall relationship-based need satisfaction may also serve as a mediator in the relationship between relative autonomous helping motivation and partner outcomes, thereby simultaneously introducing both potential mediators in the model. The mediation model, which is graphically depicted in Figure 2, provided an acceptable fit to the data: $\chi^2 (21) = 24.42$, $p = .27$, CFI = .98, RMSEA = .06, SRMR = .08. Next, three direct paths from helping motivation to the outcome variables were added. Similar to the previous analyses, results showed that helping motivation was no longer associated with the three different partner outcomes ($p > 0.05$) and that this model did not yield a superior fit ($\chi^2_{\text{diff}} (3) = 1.18$, $p = .76$). Hence, the main effects were again removed from the model. Results of these analyses suggest that relationship-based need satisfaction and helping exhaustion completely mediated the relationship between relative autonomous helping motivation and the three outcome variables. As for helping exhaustion, two of the three indirect effects (reflecting the degree of mediation) were found significant, that is, personal well-being $a_2b_{21} = .36$ ($p < .01$) and psychological distress $a_2b_{22} = -.33$ ($p < .05$). Helping exhaustion did not emerge as a significant mediator of relationship quality $a_2b_{23} = .06$ ($p > .05$). As for relationship-based need satisfaction, all three indirect effects to all three outcomes were found significant. Specifically, for personal well-being the indirect effect of helping motivation was $a_1b_{11} = .22$ ($p < .05$), for psychological distress it was $a_1b_{12} = -.19$ ($p < .05$) and for relationship quality it was $a_1b_{13} = .43$ ($p < .01$). These indirect effects reflect the effects of helping motivation through helping exhaustion and relationship-based need satisfaction on the three different outcome variables. These arrows and numbers are not drawn in
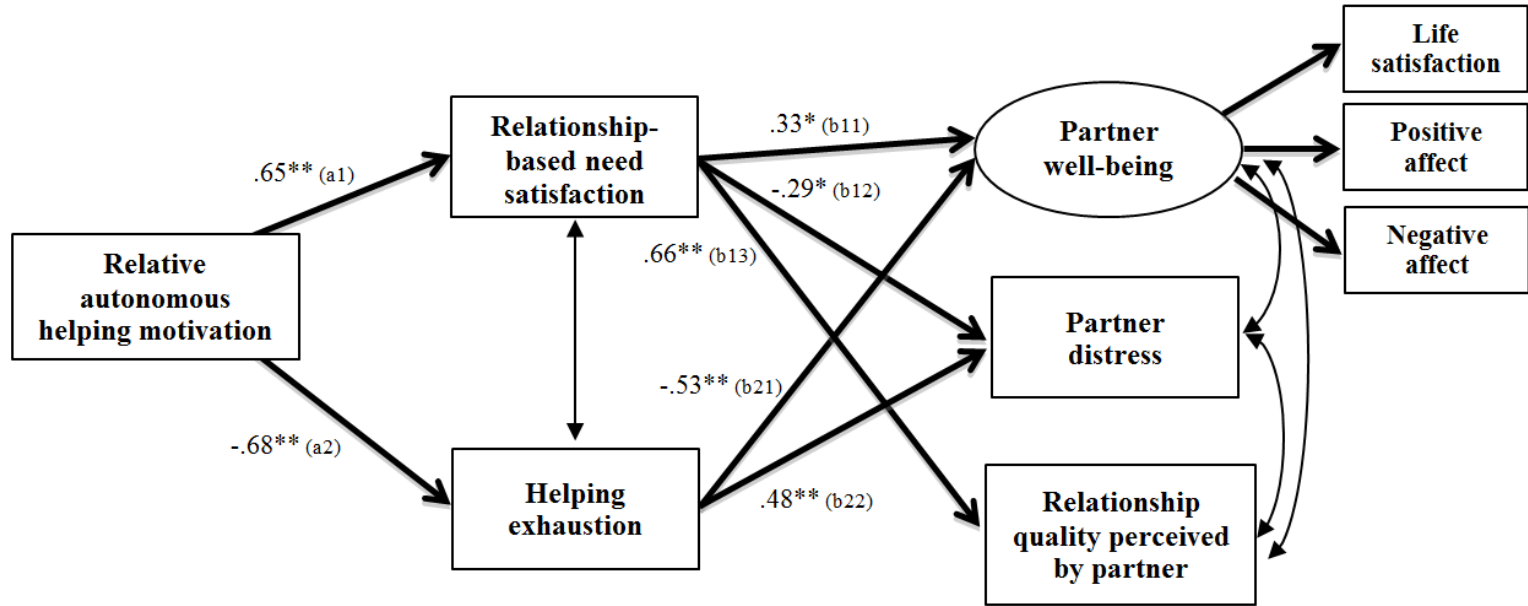
Figure 2. Mediation model of the association between partners' helping motivation and different partner outcomes. Path coefficients are standardized. *p<0.05, **p<0.01. Control variables (partner's age and gender) are not displayed because none of them was significant.

Figure 2 to maintain the clarity of the figure. In all described models, main effects for partners' age and gender were never significant.

Hypotheses 3 & 4: Helping motivation and ICP outcomes

To determine whether helping motivation would be associated with ICP outcomes, we tested a SEM model with the different ICP outcome variables (i.e., disability, personal well-being, psychological distress, and relationship quality). Because pain intensity is an important variable to take into account when explaining well-being in ICPs (e.g., Cano, Gillis, Heinz, Geisser, & Foran, 2004; Kovacs, Zamora, Llobera, & Ferna, 2004), we tested for moderation effects of pain intensity. In this SEM model fit indices were acceptable ($\chi^2_{(16)} = 20.62$, $p = .19$, CFI = .96, RMSEA = .08, SRMR = .05), but no main effects were found between partners' relative autonomous helping motivation and the different ICP outcomes. Also no main effects were found for age and gender of ICPs. Interestingly, there was a significant helping motivation by pain intensity interaction term explaining ICP reported relationship quality ($\beta = .28$, $SE = .01$, $p = .05$). Figure 3 provides simple regression lines of ICPs' relationship quality as a function of partners' helping motivation at high (+1SD) and low levels (-1SD) of ICPs' reported pain intensity. In this figure, a positive trend is suggested indicating that greater autonomous helping motivation in partners is related to higher ICP-reported relationship quality in ICPs reporting high intensity pain, which differs from the trend observed in ICPs reporting low intensity pain. As there were no direct effects of helping motivation upon ICP outcomes in this SEM model, no mediation models were further tested (hypothesis 4).
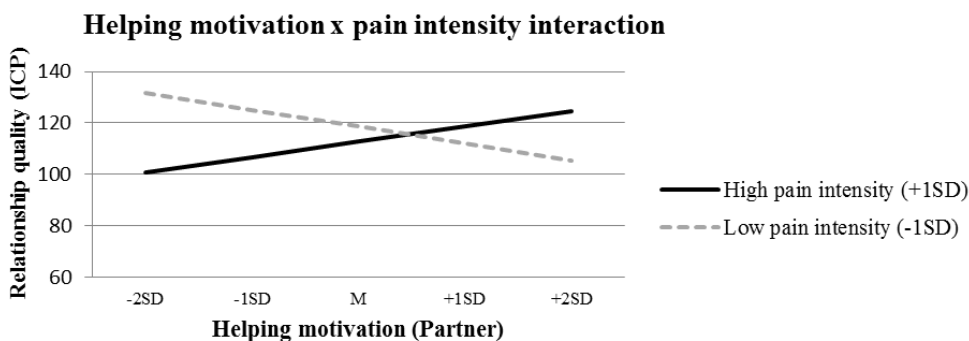
Figure 3. Interaction effect of partners' helping motivation and ICPs' pain intensity on ICP-perceived relationship quality.

DISCUSSION

We aimed at investigating whether a motivational perspective on helping, as provided by Self-Determination Theory (SDT) (Deci & Ryan, 2000), is useful in explaining the variation in personal and relational well-being and distress in partners of individuals with chronic pain's (ICPs). Furthermore, it was examined whether partners' type of helping motivation also relates to ICP outcomes.

As expected, we found that partners who helped ICPs out of autonomous relative to controlled reasons reported higher levels of individual well-being and relationship quality, and lower levels of distress. This is in line with previous findings reported by Weinstein and Ryan (Weinstein & Ryan, 2010), who found autonomous motivation to help strangers yielding similar well-being benefits for the helper. The current findings indicated that also in a context of chronic pain, autonomously motivated helping contributes to the helper's well-being. These findings equally suggest that although controlled motivated partners might provide help to their partners (ICPs), they may derive less, if any, personal and relational well-being benefits from it, and in fact, they may even experience elevated distress.

We also aimed at examining the mechanisms underlying the association between relative autonomous helping motivation and partner outcomes. Two likely mediators were put forward: helping exhaustion and relationship-based need satisfaction. As exhaustion has received numerous attention within work and organizational literature (Maslach et al., 2001), we reasoned helpers of ICPs may also feel exhausted. Much like emotionally exhausted workers report more stress-related health outcomes (Maslach et al., 2001), partners of ICPs may also experience helping their partner as being mentally and physically exhausting, thereby feeling distressed. Past work found emotional exhaustion to be more salient among controlled motivated teachers (Berghe et al., 2013; Soenens et al., 2012). Also, greater controlled motivation to care for older people was predictive for higher caregiver stress (Lyonette & Yardley, 2003). In line with these findings, we found that higher relative autonomous helping motivation was related to less helping exhaustion. It seems then that partners who experience the helping as a daunting duty, that is, as an obligatory task they cannot avoid, are more at risk for experiencing the helping as energy depleting than those with an autonomous helping motivation.

Results further suggest that to the extent helping is exhausting, there are personal and relational costs associated with it. These findings are consistent with previous research, in which caregiving burden among spouses of patients with lung cancer was related to 3- and 6-month follow-up distress in spouses (Milbury, Badr, Fossella, Pisters, & Carmack, 2013). Similarly, elderly spouses of patients with longstanding Parkinson's disease experienced elevated distress and reduced quality of life related to caregiving (Figved, Myhr, Larsen, & Aarsland, 2007).

Interestingly, helping exhaustion especially appears critical to account for the personal well-being costs associated with controlled helping motivation. When considered in conjunction with relationship-based need satisfaction it no longer related to partners' perceptions of relationship quality, presumably because its contribution was cancelled out when

controlling for variation in relationship-based need satisfaction. Specifically, higher levels of partners' relationship-based need satisfaction were related to a better personal well-being and relationship quality, while negative associations with distress were found. The present findings are consistent with previous studies showing that autonomous helping is positively associated with basic psychological need satisfaction (Gagné, 2003; Weinstein & Ryan, 2010). Presumably, partners who autonomously provide help may be more open for different strategies to provide effective help, thereby building a sense of effectiveness in responding to the patient's request for help (i.e. competence satisfaction). Further, autonomously engaged partners may be more available to help and be better attuned to empathically handle the patient's request for help, thereby more deeply connecting with the patient (i.e. relatedness satisfaction). Also, autonomous helpers may experience a greater sense of truly self-initiation and volition in helping (i.e. autonomy satisfaction). It appears that overall need satisfaction is an essential ingredient for partner's personal and relational functioning, while also protecting them against personal ill-being (Patrick et al., 2007).

Of particular interest was our research question whether partners' autonomous helping motivation would also relate to ICP outcomes. Although the findings indicated no direct relationship between partners' helping motivation and ICPs' well-being or distress, we found ICPs suffering from high pain intensity to benefit from autonomously motivated partners. Logically, partner's motives to provide help may only pay off if ICPs really are in need of help. In fact, among ICPs with low pain intensity, helping – regardless of the motive - may come across as meddlesome or reflect a lack of confidence and patience. On certain moments partners may do well to refrain from providing help to optimally nurture ICPs psychological needs.

It is possible that partners' helping motivation may affect the type (e.g., instrumental or emotional) of help provided. In this context, research has found solicitous partner responses (i.e., exhibiting concern, offering

assistance, discouraging activity) to be related to more pain behavior (Paulsen & Altmaier, 1995; Romano et al., 1992), less activity (Flor, Kerns, & Turk, 1987), more disability and physical dysfunction (Raichle, Romano, & Jensen, 2011; Romano et al., 1995; Turk, Kerns, & Rosenberg, 1992), higher tendencies to seek help (Tait & Chibnall, 1997) and greater usage of opioids (Cunningham et al., 2012) in ICPs, whereas encouragement of ICP well behaviors (i.e. engagement in healthy activities) has been associated with lower levels of ICP pain behavior (Raichle et al., 2011). These results show that different partner responses differentially relate to the pain experience and pain coping of ICPs and they may be dependent upon the present helping motivation. Also other variables, such as the feeling of warmth and connectedness in ICPs, may be affected by partners' type of helping motivation. As the present study shows, relatedness satisfaction in ICPs was significantly correlated with partners' autonomous helping motivation. Helping is an interpersonal act, which has the potential to enable the promotion of intimacy and enhance satisfaction within the couple; however, in this study there was no main effect of partners' helping motivation on the relationship quality perceived by ICPs. It is possible that helping may also be a source of conflict and disagreement within the relationship, especially when the support is unskillfully provided (Rafaeli & Gleason, 2009).

Although correlational in nature, the present study has some clinical relevance. Several studies already demonstrated the benefits of partner involvement in pain treatment (e.g., Cano & Leonard, 2006; Martire, Schulz, Helgeson, Small, & Saghafi, 2010). The present study indicates that the reason for partners to be involved in pain treatment is of critical importance. That is, although some partners might be highly motivated, their motivation maybe of rather poor quality, that is, being controlled rather than autonomous in nature. The present data indicate that when partners experience their helping role as a burden, it signals an underlying pressuring motivation to support their partner with chronic pain. Further studies will be

necessary to investigate ways to make partners move away from controlled towards more autonomous reasons for support provision. In this context, one RCT study with lung cancer patients and their family caregivers is informative, as inclusion of SDT components in a treatment program was found to yield promising results (Badr, Smith, Goldstein, Gomez, & Redd, 2015).

Limitations and suggestions for future research

The current study has several limitations that warrant mention and provide directions for future research. First, data are correlational in nature, which makes it impossible to discern causal relationships and to provide temporal explanations. Perhaps, it is the case that partners experiencing a greater sense of well-being are able to more easily assist patients, or find it less burdensome, or that those patients more satisfied with their relationship behave in ways that contribute to their partner's relationship-based need satisfaction and autonomous helping motivation. Future longitudinal studies may need to examine possible potential benefits of autonomous helping motivation in explaining personal and relational well-being over time. Another interesting avenue for future research, for which longitudinal designs are a prerequisite, is the investigation of changes in partner's support behavior and motivation to provide support after the onset of chronic pain in couples. Also diary studies are promising in this regard because it may show considerable day-to-day variation with resultant variation in partner and ICP outcomes. If helping motivation is dynamic, it should also be susceptible to change due to experimental activation, for which experimental designs might be useful to extend the current findings. A second limitation is that no actual amount of assistance provided or received was measured in this study, as we only focused upon the motives for helping. Third, all obtained data relied solely on self-reports. Taking observational measures into account might be an important focus for further inquiry, to examine in which helping behavior partners engage and how that influences partner's helping exhaustion and

patient's pain outcomes. Fourth, although post-hoc power analyses[5] showed that the present study with about 50 ICP/partner dyads had more than 90% power to detect large effects (r > .50), it had less than 60% power to detect small to medium effects (r < .30), making it possible to miss effects. Future studies could replicate our findings with a bigger sample size. Fifth, our sample was one of committed, generally satisfied couples. This selection bias possibly led to more autonomous helping motives in partners. It may be that relationships are already broken down when partners experience high levels of controlled motivation. However, previous research with chronic pain patients has shown similar response rates and the characteristics of the current sample (e.g., gender and age) were comparable with other studies (e.g., Lyons, Jones, Bennett, Hiatt, & Sayer, 2013). Future research could also gain further insight whether a particular combination of scores on autonomous and controlled motivation is critical. There are already some studies about different motivational profiles (e.g., Haerens, Kirk, Cardon, De Bourdeaudhuij, & Vansteenkiste, 2010; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009), showing that more motivation is not necessarily better. That is, although individuals may display elevated levels of controlled motivation compared to others, while being equal in terms of autonomous motivation, the additional presence of controlled motivation does not yield more beneficial functioning, on the contrary. Future studies in the area of helping motivation could also examine such motivational profiles in greater detail. Finally, future studies could identify antecedents of autonomous helping motivation,

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[5] Post-hoc power analyses indicated that with a sample of size 48 there is about 90% power to detect the observed effects of partners' helping motivation on partners' personal well-being, distress, and relationship quality. The post-hoc power for the indirect effects of relative helping motivation through helping exhaustion on partners' well-being and psychological distress, and the indirect effect through relationship-based need satisfaction on relationship quality were all above 90%, while for other indirect effects post-hoc power was substantially smaller. The observed moderation effect of pain intensity outlined in the results section (hypothesis 3) had relatively low post-hoc power too (about 60%).

which may provide more specific tools for pain treatment with involvement of partners.

Despite these limitations, the present study provides new insight into why partners of ICPs may become distressed and how they impact ICP outcomes. When partners are volitionally committed to provide help rather than experiencing it as a pressuring duty, their basic psychological needs in the relationship with their ICP are more likely to get fulfilled and they may experience less helping exhaustion. This, in turn, relates positively to their own personal and relational well-being. Moreover, autonomous helping motivation was also associated with a better relational functioning of ICPs in need of help, that is, those with high levels of pain. In short, the SDT-perspective seems promising to provide new insights in intimate partner interactions in a context of pain and awaits further testing.

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HELPING MOTIVATION AND WELL-BEING OF CHRONIC PAIN COUPLES: A DAILY DIARY STUDY[1]

Receiving support from a romantic partner may yield benefits for individuals with chronic pain (ICPs), but may also carry unintended side effects. The conditions under which partner support provision yields (mal)adaptive effects deserve greater attention. Grounded in Self-Determination Theory, partners may provide help for autonomous or volitional (e.g., enjoyment, full commitment) or rather controlled or pressured (e.g., avoiding guilt and criticism) motives. The present study examined associations between day-to-day fluctuations in partners' type of helping motivation and several outcomes, among partners and ICPs.

Seventy couples, with one partner having chronic pain (75.7% female), completed a diary for 14 consecutive days. Daily helping motivation was assessed together with daily affect, relational conflict, and relationship-based need satisfaction. Partners (M_{age}=55.14) additionally reported on daily helping exhaustion, while ICPs (M_{age}=54.71) reported on daily pain intensity, disability, satisfaction with and amount of received help.

Providing autonomous help related to improvements in partners' affective (e.g., positive affect), relational (e.g., conflict) and help-specific (e.g., exhaustion) functioning, which were accounted for by improvements in daily relationship-based psychological need satisfaction. Similarly, daily autonomously motivated help yielded a direct (i.e., relational conflict; perceived amount of help) or indirect (i.e., positive and negative affect; relational conflict; satisfaction with help, disability) contribution in explaining ICP outcomes - through improvements in ICPs' relationship-based psychological need satisfaction.

Findings highlight the importance of a motivational and dynamic perspective on help provision within chronic pain couples. Considering reasons why a partner provides help is important to understand when partners and ICPs may benefit from daily support.

INTRODUCTION

As primary providers of support, romantic partners of individuals with chronic pain (ICPs) face the challenge of providing adequate help on a daily basis (Goubert, 2015; Newton-John, 2013). Although partner support allows ICPs to better cope with pain (e.g., Evers, Kraaimaat, Geenen, Jacobs, & Bijlsma, 2003; Suurmeijer et al., 2005; Zyrianova et al., 2000), the helping process may also entail conflicts and can be experienced as less effective (Boothby, Thorn, Overduin, & Charles Ward, 2004; Romano, Jensen, Turner, Good, & Hops, 2000; Schwartz, Jensen, & Romano, 2005; Turk, Kerns, & Rosenberg, 1992). Furthermore, because of its repetitive nature, partners often appraise their helping role as stressful, which may deplete their ability to provide daily support (Berg & Upchurch, 2007; Jones, Hadjistavropoulos, Janzen, & Hadjistavropoulos, 2011; Ybema, Jan, Kuijer, Roeline, Hagedoorn, & Buunk, 2002). The present diary study examined *when* and *why* partners' support provision has (mal)adaptive effects for both the partner and the ICP.

Drawing from Self-Determination Theory (SDT) (Edward L Deci & Ryan, 2000), a broad theory on human motivation, we propose that reasons why partners provide support are crucial. Individuals may provide help for *autonomous* or volitional motives (e.g., enjoyment, full commitment) or rather *controlled* or pressured motives (e.g., avoidance of guilt/criticism, garnering of appreciation) (Edward L Deci & Ryan, 2000). Helping for autonomous, instead of controlled, reasons relates to greater empathy and helping satisfaction (Millette & Gagné, 2008; Ryan et al., 1989), less intentions to quit (Millette & Gagné, 2008), and more effortful helping (Bidee et al., 2013) among healthy volunteers, while it relates to less depressive symptoms in spouses of cancer patients (Kim, Carver, Deci, & Kasser, 2008) and better (individual/relational) functioning in partners of ICPs (Kindt et al., 2015). Autonomous helping motivation yields benefits because both partners' and patients' basic psychological needs for relatedness, autonomy, and competence get better satisfied, which constitute
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critical nutrients for individuals' well-being (Chen et al., 2015; Edward L Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013). If partners fully endorse the helping instead of experiencing it as a daunting duty, they derive a greater sense of closeness, volition, and effectiveness from the helping (Kindt et al., 2015). Interestingly, partners' helping motivation could also be a catalyzer for the need satisfaction of ICPs and, hence, for ICP well-being. One study with healthy individuals found that the well-being benefits of autonomous helping motivation also applied to the recipients of help (Weinstein & Ryan, 2010). Autonomously motivated helpers are more open, curious, and receptive to the preferences of the person in need (Hodgins & Knee, 2002) and, hence, may be better able to attune the timing, amount, and type of provided help, which is critical to nurture the recipient's psychological needs.

This study is the first to explore daily fluctuations in partners' helping motivation in the context of couples dealing with chronic pain. We investigated the relations between partners' daily helping motivation and daily changes in partners' and ICPs' functioning, as indexed by positive/negative affect and relational conflict (partners and ICPs), helping exhaustion (partners only) and perceived amount of received help, satisfaction with received help and disability (ICPs only). These outcomes were selected because they are situated on three levels of generality (Vallerand, 1997): general (e.g., affect), relational (e.g., conflict) and help-specific (e.g., helping exhaustion). First, we hypothesized that daily variation in partners' autonomous, relative to controlled, helping motivation would relate uniquely to changes in daily variation in partners' and ICPs' functioning. Regarding ICP outcomes, relationships are expected to be stronger on days with high intensity pain (Kindt et al., 2015). Second, we hypothesized that partners' and ICPs' daily relationship-based need satisfaction and frustration would function as mediators for the presumed benefits of autonomous, relative to controlled, helping motivation (Kindt et al., 2015; Weinstein & Ryan, 2010).

METHODS

Study design

The present study is part of a larger study, the "Helping Motivation Diary and Longitudinal Study" (HMDAL-Study), among ICPs and their partner, which comprises, apart from the diary assessment that is reported herein, three separate waves of questionnaire administration, spread across 6 months. For the purpose of the present study, the ICPs and their partners completed daily diaries during 14 days, starting after the T1 questionnaire administration. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Study participants

Participants were couples, recruited through the Flemish Pain League, an umbrella organization for ICPs (see Figure 1). In October 2013, members of the Flemish Pain League received an invitation letter to participate in studies about chronic pain and quality of life in our lab. About 20.78% ($N = 412$) agreed to be contacted by phone. Only members that agreed that their partner would participate in the study were approached. Inclusion criteria for participation of ICPs in the present study were (1) having chronic pain for at least 3 months, (2) physically living together with a partner for at least one year and (3) being sufficiently proficient in Dutch. From the couples that were contacted by phone and who met the inclusion criteria, 86.20% ($N =100$) was willing to participate. Main reasons for refusal to participate ($N = 16$) were no interest of the partner for taking part in the study, personal or medical problems, or lack of time. Three couples later withdrew from the study because of ICP illness ($N = 1$), job responsibilities ($N = 1$) or an unexpected surgery of the partner ($N = 1$),

which resulted in a final sample of 97 couples[2] taking part in the HMDAL-study. In the present diary study the first 70 couples were included.
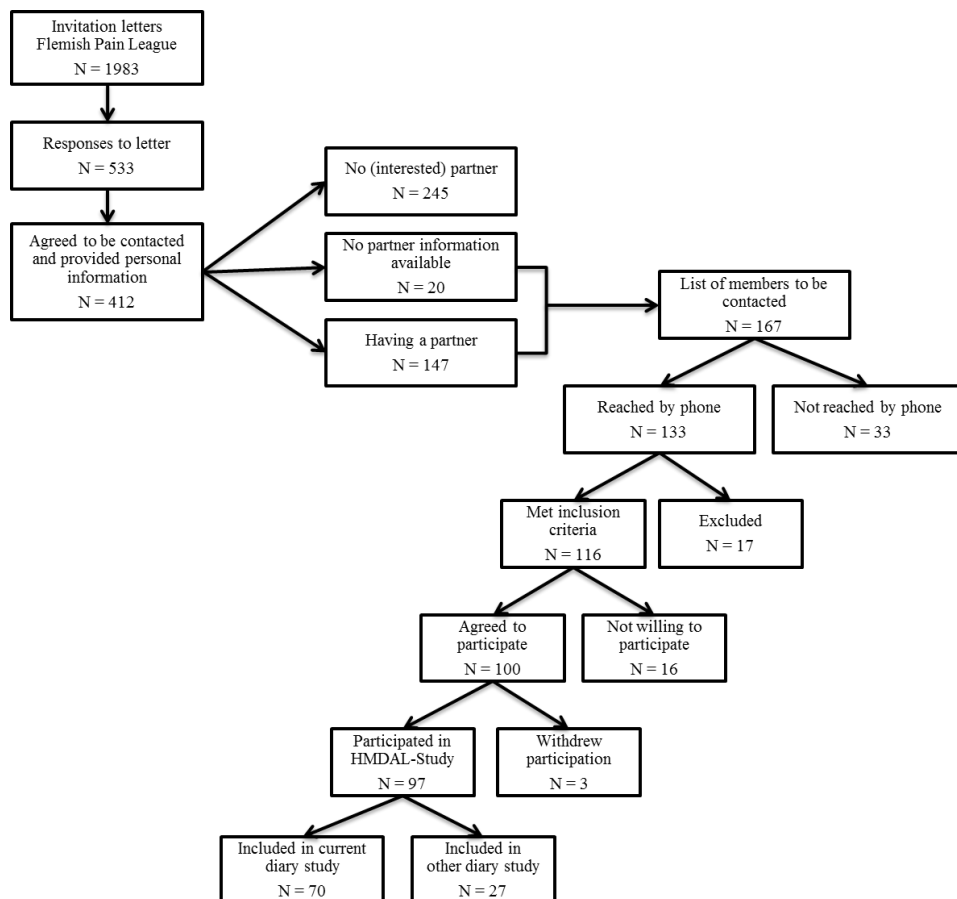
Figure.1. Flowchart of how sample size was obtained through the Flemish Pain League.

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[2]These 97 couples participated in the larger HMDAL-Study, in which we aimed at recruiting 140 chronic pain couples in collaboration with the Flemish Pain League and the Flemish League for Fibromyalgia Patients. Apart from a longitudinal questionnaire study ($N=140$ couples), also two diary studies (two times $N=70$ couples), each addressing a different set of hypotheses, were conducted. The first diary study is described in this paper and includes the first 70 couples that participated in the HMDAL-Study. Couples described in this paper were all members of the Flemish Pain League. Details about the other participating couples, together with more information about the recruitment through the Flemish League for Fibromyalgia Patients will be reported elsewhere.

The majority of ICPs were female ($N = 53$; 75.5%); mean age of ICPs and their partner was 54.71 years ($SD = 9.97$) and 55.14 years ($SD = 10.21$), respectively. All couples were Caucasian and most of them (65.7% of ICPS; 72.9% of partners) reported an education until at least the age of 18 and were married or legally cohabiting (82.9%). The mean relationship duration was 27.84 years ($SD = 13.99$). The majority of partners were employed ($N = 41$; 58.6), while only 24.3% of ICPs ($N = 17$) was employed. Almost all ICPs reported more than one pain location (M = 3.39, $SD = 1.64$; range 1–7), with pain in the back (85.7%), neck (60%), and lower extremities (56.5%) being reported most frequently. Mean pain duration was 19.41 years ($SD = 14.19$). On a scale from 0 to 10, ICPs reported a mean pain intensity of 6.85 ($SD = 1.55$) and a mean disability of 6.64 ($SD = 1.91$). Thirty-two partners (i.e., 45.71%) also reported pain complaints during the past three months (which is similar to other studies with chronic pain couples, e.g., Issner, Cano, Leonard, & Williams, 2012). Paired-samples t-tests showed that pain duration (M = 8.84, $SD = 12.18$), pain intensity (M = 4.39, $SD = 1.76$) and disability (M = 2.94, $SD = 2.39$) were significantly lower in partners compared with the ICPs (all $ps <.01$; M = 18.27, $SD = 10.08$; M = 6.65, $SD = 1.51$; M = 6.64, $SD = 2.31$).

Data collection procedure

Participants were contacted by telephone upon agreement to (1) provide more information about the present study and (2) assess inclusion criteria. If both partners in a couple reported having chronic pain, the individual with the longest pain duration was chosen as the ICP. The informed consents and baseline questionnaires were administered via a home visit. After completing the questionnaires, further explanation about the diary study was given. Participants were instructed to fill out the diary in the evening for 14 consecutive days. If there were no planned holidays, participants started filling in the diary the day after the home visit. Both partners received a link and a personal code for completing the diary online.

When no computer and/or internet was available, or when participants indicated to have no experience with computer/internet, they received a diary booklet on paper[3]. As a sign of appreciation, couples received a fee of 30 euros after completing the 2-week diary. To enhance completion rates we offered the opportunity to receive a text message every evening as a reminder for completing the diary.

Out of a potential 1960 end-of-day observations (140 individuals (within 70 couples) x 14 days), a total of 1895 were complete (96.68%). Records completed after 10AM the next morning[4] were deleted, as suggested by Nezlek (Nezlek, 2012). Using this criterion 1889 of the 1895 completed observations were included in the analyses (i.e., 99.68% of the completed observations, 96.38% of total possible observations).

Diary measures

All measures described below were collected each evening during the 14 consecutive days for both ICPs and partners, unless otherwise specified. To estimate item reliability, a multilevel confirmatory factor analysis framework was used that enables the examination of level-specific reliabilities (Geldhof, Preacher, & Zyphur, 2014). Within- and between-level alphas are reported.

Daily helping motivation (only partners)

To measure partners' daily helping motivation, we selected 8 items from the Motivation to Help Scale that was adapted in a previous study for use with chronic pain couples (Kindt et al., 2015). Every evening, partners received a list of 8 reasons for helping or supporting their partner in pain. They reported on how true these motives were for helping their partner the past day on a 7-point scale ranging from "0" (not at all true) to "6" (totally true). Drawing from SDT, four different types of motivation were

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[3] Fifteen ICPs and 16 partners used the paper version of the diary.
[4] For the paper versions of the diary we relied on the date/time indicated by the participant.

distinguished: external motivation (2 items, e.g., "because my partner demanded it from me"), introjected motivation (2 items, e.g., "because I would feel guilty if I didn't help"), identified motivation (2 items, e.g., "because I think it is important to help my partner") and intrinsic motivation (2 items, e.g., "because I enjoy helping my partner"). Items of external and introjected motivation were summed up to represent controlled motivation to help; items of identified and intrinsic motivation were summed to represent autonomous motivation to help. In line with previous studies (e.g., Kindt et al., 2015; Weinstein & Ryan, 2010), an overall index reflecting the relative degree of autonomous helping motivation was calculated by subtracting controlled motivation from autonomous motivation scores. The scale was reliable at the within-person (α = .58) and between-person (α = .80) level. When partners indicated that they did not provide help during the past day, they did not receive the helping motivation items. Out of a total of 980 days (70 partners * 14 days), only for 54 days (i.e., 5.5%) scores for helping motivation were missing because partners reported they did not provide support that day.

Daily affect

Participants reported on how they felt during the day by rating 12 adjectives describing 6 positive affective states (e.g., proud, happy, relaxed) and 6 negative affective states (e.g., sad, nervous, scared) (J. Fontaine & Veirman, 2013). Items on a 7-point scale ranged from 0 (totally disagree) to 6 (totally agree). Daily scores were computed by averaging each participant's ratings for positive and negative affect. In the present study all scales were reliable, with a within-person α of .92 and .87 and a between-person α of .98 and .96 for ICPs' positive and negative affect. For partners' positive and negative affect the within-person α was .93 and .85 and the between-person α was .98 and .94.

Daily relational conflict

Each evening participants indicated whether they had relational tensions or conflicts during the past 24 hours on a 7-point scale ranging from 0 (not at all) to 6 (very much).

Daily helping

Three help-related variables, one among partners and two among ICPs were assessed. Partners reported on the amount of exhaustion they felt by the efforts of helping their partner in pain that day. Three items were selected from a questionnaire used in a previous study with chronic pain couples (Kindt et al., 2015) and were slightly adapted to a daily context. Items ranged from 0 (totally disagree) to 6 (totally agree) and started with "Helping/supporting my partner…" followed by "physically exhausted me", "was tiresome" and "mentally exhausted me". The scale was reliable at the within-person (α = .81) and between-person (α = .97) level. Parallel to the helping motivation items, these items were only filled in by partners if they reported that they provided any help during the past day. ICPs reported on the amount of received help (i.e., "Did your partner provide help or support today?") and on their satisfaction with the received help (i.e., "I am satisfied with the help/support that I received from my partner today"). Both items were rated on a scale varying from 0 (totally disagree) to 6 (totally agree). ICPs did not fill in the satisfaction with help item when they scored '0' on the amount of received help.

Daily disability (only ICPs)

To measure daily disability in ICPs we adapted an item of the Graded Chronic Pain Scale (Von Korff, Ormel, Keefe, & Dworkin, 1992) to a daily context, in line with previous studies in ICPs (Van Ryckeghem et al., 2013). The item "To what extent did your pain hinder you in your activities today?" ranged from 0 (no interference) to 6 (impossible to carry out activity).

Daily pain intensity (only ICPs)

Items for pain intensity were based on the Graded Chronic Pain Scale (Von Korff et al., 1992) and adapted to a daily context. Every evening, ICPs completed an item asking "On average, how much pain did you have today?" and "How intense was your worst pain today?". Items were rated on a 7-point scale ranging from 0 (no pain) to 6 (worst imaginable pain). The scale was reliable at the within-person (α = .88) and between-person (α = .95) level.

Daily relationship-based need satisfaction and frustration

To measure daily satisfaction and frustration of the three basic psychological needs, we selected 2 items for each basic psychological need (one item for need satisfaction and one for need frustration) of the Basic Psychological Need Satisfaction Need Frustration Scale (BPNSNF) (Chen et al., 2015) and slightly adapted them to a daily relational context by starting each item with "In the relationship with my partner today…". Example items are: "…, I could freely take decisions" (i.e., autonomy satisfaction), "…, I felt pressured to do things that I wouldn't choose myself" (i.e., autonomy frustration), "…, I was confident that I could do things right" (i.e., competence satisfaction), "…, I felt like a failure by the mistakes I made" (i.e., competence frustration), "…, I felt that (s)he cared about me" (i.e., relatedness satisfaction), and "…, I felt my partner was detached" (i.e., relatedness frustration). Exploratory factor analyses on the need satisfaction and need frustration items, thereby using a promax rotation, demonstrated that two factors needed to be retained, which explained more than 65% of the variance in both partner and ICP responses and clearly resembled a need satisfaction and need frustration factor. Next, to provide further evidence for the validity of our daily need satisfaction/frustration measures, correlations between the aggregated diary scores for partner/ICP need satisfaction and frustration and the respective subscales of BPNSFS (see Chen et al. 2015; Vanhee et al. 2016), as assessed in our baseline measurement, were

inspected. Each of these correlations were positive, ranging from .42 to .66, all *ps* <.01. In light of these findings, items assessing need satisfaction and frustration were averaged. In ICPs, subscales showed moderate to good reliability for need satisfaction and need frustration at the within-person (α = .69 and .53, respectively) and at the between-person level (α = .83 and .70, respectively). For partners, reliabilities for need satisfaction and need frustration at the within-person (α = .71 and .55, respectively) and at the between-person level (α = .86 and .87, respectively), were also moderate to good.

Data analytic strategy

A series of multilevel models were fitted using PROC MIXED in SAS 9.4 to examine same-day associations between partners' helping motivation and partner and ICP outcomes. Each outcome (both partners: positive and negative affect, conflict; partners only: helping exhaustion; ICPs only: satisfaction with received help, disability) was modeled separately. With 70 couples and daily diary measures during 2 weeks, the study had more than 90% power to detect a standardized effect equal to .15 at the 5% significance level at the within-subject level. In these multilevel models, we controlled for age and sex of the partner (in models with partner outcomes) and for age and sex of ICPs (in models with ICP outcomes). Data were analyzed considering two different levels; a within-couple level (i.e., Level 1) and a between-couple level (i.e., Level 2). Conceptually there are three levels of analysis (day, person, couple); however, only levels with random variability need to be modeled (Bolger & Laurenceau, 2013; Kenny, Kashy, & Cook, 2006). In the case of distinguishable dyads (e.g., ICP versus partner), there is no additional variability at the middle level, which means that a conceptual three-level model can be represented by a model with only two levels (Bolger & Laurenceau, 2013).

In preparation for data analysis, all daily predictors were centered within clusters (i.e. in this case person-mean centered) (Enders & Tofighi,

2007), as this is considered the most appropriate form of centering when the primary interest involves a Level 1 predictor (i.e., daily helping motivation). This method removes all between-couple variation from the predictor and yields a "pure" estimate of the pooled within-couple (i.e., Level 1) regression coefficient (Enders & Tofighi, 2007). To control for between-couple variation, each partner's mean value for helping motivation was added as a predictor at Level 2. By including this mean score, the effect of helping motivation on partner and ICP outcomes is partitioned into two parts (West, Ryu, Kwok, & Cham, 2011): (a) the effect of daily deviations from each partner's mean level of helping motivation on different outcomes (within-couple component) and (b) the effect of each partner's mean level of helping motivation on different outcomes (between-couple component). Further, Level 2 covariates were grand-mean-centered (i.e., age). Notably, because a sample size of 70 couples only yields 22% power to detect a between-subject standardized effect equal to .15, predictors at the between-couple level were not addressed in the research questions of the current study, but only controlled for.

For each outcome, a baseline model was estimated first to calculate the intraclass correlation coefficient. Next, predictors were added in the model. An autoregressive covariance structure was used in the analyses to take autocorrelation into account (Bolger & Laurenceau, 2013). This structure has homogeneous variances and correlations that decline exponentially with distance. To examine whether partners' daily helping motivation related to a change in outcomes in partners and ICPs, we controlled for prior day levels of the outcome. An overview of the variables added in the analyses at Level 1 and 2 is presented in Tables 2 and 3. The variables that are part of the proposed mediation were all at the within-couples or the lower level (i.e., Level 1); therefore, the mediation analyses we conducted are also referred to as 1 → 1 → 1 mediation or lower level mediation (Bauer, Preacher, & Gil, 2006; Kenny, Korchmaros, & Bolger, 2003). Multilevel mediation allows for the possibility that each of the effects

may vary across couples. In the absence of upper-level variation of the effect of the exposure on the mediator (the a-path) and of the mediator on the outcome (the b-path), the mediated effect in the 1-1-1 setting reduces to *a*b*. In line with other diary studies (Badr, Laurenceau, Schart, Basen-Engquist, & Turk, 2010), we found no evidence against such homogeneous effects (i.e. the corresponding random effect variances were very small).

RESULTS

Descriptive statistics and Preliminary Analyses

Table 1 provides between-couple correlations, based on the aggregated diary scores (*N*=70), between the variables of interest. Within-couple correlations in the measured variables are shown on the diagonal. The positive and negative affect scores of partners and ICPs were not correlated. In contrast, relational conflicts and need satisfaction and frustration were positively correlated within the couple. Paired samples *t*-tests further showed that partners, in general, reported more positive affect (*t*=5.22, *p*<.01) and less negative affect (*t*=-3.40, *p*<.01) than ICPs.

The ICC represents the percentage of the total variance of a variable that is due to between-couple mean differences (Bolger & Laurenceau, 2013). The amount of within-couple variation can be calculated by subtracting the ICC from 1. Within-couple differences accounted for 27.57% of the variance in partners' helping motivation (see Table 1). The variable with the largest within-couple variation was relational conflicts with 68.81% when measured in partners and 71.19% when measured in ICPs.

Table 1. Means and Standard Deviations of Aggregated Variables, ICC values, and Correlations among Study Variables (for ICPs below and partners above the diagonal)

	1	2	3	4	5	6	7	8	9	10	11	partner M	SD	ICP M	SD	ICC partner	ICP
1. Autonomous Motivation[P]	-	.42**	-.49**	-.52**	-.20†	.17	.20	.19	.19	.57**	-.54**	2.19	1.47	-	-	72.43	-
2. Positive Affect	.07	**_.02_**	-.63**	-.40**	-.42**	-.05	-.07	.04	.01	.51**	-.33**	3.77	1.02	2.77	1.20	51.5	59.24
3. Negative Affect	-.04	-.55**	**_-.03_**	.41**	.30*	-.06	.03	-.17	-.14	-.35**	.53**	.95	.78	1.45	1.14	69.68	52.11
4. Relational Conflict	-.28*	-.07	.26*	**_.50**_**	.35**	-.26*	-.17	-.06	-.06	-.72**	.56**	.77	.74	.73	.77	31.19	28.81
5. Helping Exhaustion[P]	-	-.03	.11	-.00	-	.02	.14	.10	.15	-.41**	.32**	.64	.89	-	-	61.25	-
6. Satisfaction Received Help[ICP]	.17	.14	-.13	-.47**	.02	-	.68**	-	-	.24*	-.13	-	-	4.37	1.05	-	44.22
7. Amount Received Help[ICP]	.20	.03	-.02	-.27*	.14	.68**	-	-	-	.26*	.04	-	-	3.46	1.33	-	55.70
8. Disability[ICP]	.19	-.42**	.33**	-.03	.10	.11	.28*	-	-	.19	-.10	-	-	3.31	1.21	-	56.08
9. Pain Intensity[ICP]	.19	-.43**	.34**	.00	.15	.08	.27*	.89**	-	.19	-.14	-	-	3.53	1.10	-	64.74
10. Psychological Need Satisfaction	.36**	.46**	-.34**	-.49**	-.05	.62**	.43**	-.12	-.09	**_.40**_**	-.59**	4.33	1.02	4.19	1.02	62.44	57.62
11. Psychological Need Frustration	-.33**	-.26*	.63**	.64**	.12	-.48**	-.34**	.12	.08	-.36**	**_.30*_**	.95	.83	1.02	.80	42.97	45.72

Note. Values along the diagonal (bold, italic, underlined) represent within-couple correlations. ICP = only measured in ICPs, P = only measured in partners

M=mean, SD=standard deviation, ICC=intraclass correlation coefficient

†$p<.10$

*$p<.05$

**$p<.01$

Partners' daily helping motivation and partner/ICP outcomes

To investigate the associations of partners' daily helping motivation with partner and ICP outcomes, we analyzed each outcome separately. Results of these analyses are displayed in Table 2 (partner outcomes) and Table 3 (ICP outcomes).

After controlling for measures assessed the previous day, fluctuations in partners' daily autonomous helping motivation related positively to improvements in positive affect and decreases in negative affect, relational conflict, and helping exhaustion among partners. Taking into account ICP's daily pain intensity, the significance of partners' daily helping motivation predicting partner outcomes was left intact, attesting to the robustness of the impact of daily helping motivation on partner outcomes. In all described models, partner age and sex were not significant (see Table 2).

Next, we examined whether partners' daily helping motivation would relate to ICP outcomes as well. With respect to the day-level measures, fluctuations in partners' daily helping motivation related to improvements in ICPs' satisfaction with and amount of received help, while predicting decreases in relational conflict. Next, when controlling for the contribution of ICP's daily pain intensity, the initially observed effect for satisfaction with received help became non-significant, while pain intensity appeared to be a systematic predictor of all outcomes among ICPs (except for the amount of received help; see third column in Table 3). To further test whether the relation between partners' helping motivation and ICP outcomes differs depending on reported ICP pain intensity, we performed several moderation analyses, which revealed no significant interaction effects. Furthermore, also in these models, ICP age and sex appeared to be no significant predictor (see Table 3).

Table 2. Multilevel Regression Analyses: Partners' Daily Helping Motivation Predicting Partner Outcomes

Daily predictor	Positive Affect				Negative Affect			
	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI
Level 1 (within-couple)								
Helping Motivation	.16 (.03)***	[.09; .22]	.16 (.03)***	[.10; .23]	-.11 (.03)***	[-.18; -.04]	-.11 (.03)**	[-.18; -.04]
Outcome Previous Day	-.16 (.03)***	[-.23; -.09]	-.17 (.03)***	[-.24; -.10]	-.24 (.03)***	[-.31; -.17]	-.25 (.03)***	[-.31; -.17]
ICP Pain Intensity			-.16 (.04)***	[-.24; -.08]			.14 (.04)***	[.06; .22]
Level 2 (between-couple)								
Mean Helping Motivation	.26 (.09)**	[.10; .43]	.29 (.09)**	[.11; .46]	-.23 (.06)***	[-.35; -.11]	-.22 (.06)***	[-.34; -.10]
Mean ICP Pain Intensity			-.14 (.12)	[-.37; .08]			-.04 (.08)	[-.20; .12]
sex	.16 (.28)	[-.38; .71]	.26 (.29)	[-.31; .82]	.11 (.19)	[-.27; .49]	.13 (.20)	[-.26; .52]
age	-.01 (.01)	[-.03; .02]	-.00 (.01)	[-.03; .02]	.00 (.01)	[-.01; .02]	.00 (.01)	[-.01; .02]
-2 Res Log Like	2054.7		2037.7		2029.3		2018.7	
	Conflict				Helping Exhaustion			
	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI
Level 1 (within-couple)								
Helping Motivation	-.16 (.04)***	[-.23; -.08]	-.16 (.04)***	[-.23; -.08]	-.11 (.03)***	[-.16; -.05]	-.11 (.03)***	[-.17; -.05]
Outcome Previous Day	-.17 (.03)***	[-.24; -.10]	-.17 (.03)***	[-.24; -.11]	.00 (.00)	[-.00; .00]	.00 (.00)	[-.00; .00]
ICP Pain Intensity			.08 (.05)	[-.01; .17]			.07 (.03)*	[.00; .13]
Level 2 (between-couple)								
Mean Helping Motivation	-.20 (.06)***	[-.31; -.10]	-.20 (.06)***	[-.32; -.09]	-.23 (.08)**	[-.39; -.07]	-.23 (.08)**	[-.40; -.07]
Mean ICP Pain Intensity			-.00 (.08)	[-.15; .15]			.08 (.11)	[-.14; .31]
sex	.29 (.18)	[-.07; .64]	.29 (.19)	[-.08; .66]	-.35 (.26)	[-.85; .16]	-.36 (.26)	[-.88; .15]
age	.01 (.01)	[-.01; .02]	.01 (.01)	[-.01; .02]	-.01 (.01)	[-.03; .01]	-.01 (.01)	[-.03; .02]
-2 Res Log Like	2140.2		2137.8		1723.3		1721.9	

Note. ICP = individuals with chronic pain, -2 Res Log Like = value of -2 times Residual Log Likelihood. CI = confidence interval. Results displayed in the first column of each outcome variable are analyses without controlling for ICP pain intensity. Results in the third column of each outcome variable represent analyses including ICP pain intensity. *p<.05; **p<.01; ***p<.001.

Table 3. Multilevel Regression Analyses: Partners' Daily Helping Motivation Predicting ICP Outcomes

	ICP Outcomes											
Daily predictor	Positive Affect				Negative Affect				Conflict			
	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI
Level 1 (within-couple)												
Helping Motivation	.05 (.04)	[-.02; .13]	.07 (.04)	[-.00; .13]	-.02 (.04)	[-.10; .06]	-.04 (.04)	[-.11; .04]	-.14 (.04)***	[-.22; -.06]	-.15 (.04)***	[-.23; -.07]
Outcome Previous Day	-.09 (.04)*	[-.16; -.02]	-.07 (.03)*	[-.13; -.00]	-.16 (.04)***	[-.23; -.09]	-.12 (.04)**	[-.19; -.05]	-.19 (.04)***	[-.26; -.11]	-.19 (.04)***	[-.26; -.12]
ICP Pain Intensity			-.48 (.04)***	[-.56; -.39]			.40 (.05)***	[-.19; -.05]			.14 (.05)**	[.04; .23]
Level 2 (between-couple)												
Mean Helping Motivation	.00 (.11)	[-.21; .22]	.08 (.10)	[-.11; .28]	.03 (.10)	[-.16; .23]	-.03 (.09)	[-.21; .15]	-.09 (.06)	[-.21; .03]	-.09 (.06)	[-.22; .03]
Mean ICP Pain Intensity			-.56 (.13)**	[-.82; -.30]			.44 (.12)**	[.19; .68]			.03 (.09)	[-.14; .19]
Sex	.34 (.37)	[-.40; 1.07]	-.01 (.34)	[-.67; .66]	-.16 (.34)	[-.82; .50]	.09 (.32)	[-.53; .71]	-.28 (.21)	[-.69; .12]	-.27 (.21)	[-.68; .15]
Age	-.00 (.00)	[-.00; .00]	-.00 (.00)	[-.00; .00]	.00 (.00)	[-.00; .00]	.00 (.00)	[-.00; .00]	-.00 (.00)	[-.00; .00]	-.00 (.00)	[-.00; .00]
-2 Res Log Like	2198.8		2070.9		2287.6		2213.3		2247.3		2246.6	

	Satisfaction Received Help				Amount Received Help				Disability			
	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI	B (SE)	95% CI
Level 1 (within-couple)												
Helping Motivation	.10 (.05)*	[.00; .20]	.10 (.05)	[-.00; .20]	.13 (.05)**	[.04; .23]	.13 (.05)**	[.04; .23]	.05 (.04)	[-.04; .13]	.02 (.03)	[-.05; .08]
Outcome Previous Day	-.28 (.04)***	[-.35; -.21]	-.28 (.04)***	[-.35; -.20]	-.30 (.04)***	[-.37; -.23]	-.29 (.04)***	[-.36; -.22]	-.12 (.04)**	[-.19; -.04]	.01 (.03)	[-.04; .06]
ICP Pain Intensity			-.16 (.06)**	[-.28; -.04]			.09 (.06)	[-.02; .20]			.93 (.04)***	[.85; 1.00]
Level 2 (between-couple)												
Mean Helping Motivation	.06 (.09)	[-.13; .10]	.05 (.10)	[-.13; .24]	.14 (.11)	[-.08; .36]	.11 (.12)	[-.11; .34]	.12 (.10)	[-.08; .32]	-.02 (.05)	[-.12; .08]
Mean ICP Pain Intensity			.08 (.14)	[-.19; .35]			.23 (.16)	[-.07; .54]			1.00 (.07)***	[.86; 1.13]
Sex	.42 (.32)	[-.19; .63]	.43 (.32)	[-.21; 1.06]	-.05 (.38)	[-.80; .70]	.07 (.39)	[-.69; .83]	-.26 (.34)	[-.93; .41]	.27 (.17)	[-.06; .60]
Age	.00 (.00)	[-.00; .00]	.00 (.00)	[-.00; .00]	.00 (.00)	[-.00; .00]	.00 (.00)	[-.00; .00]	-.00 (.00)*	[-.00; -.00]	-.00 (.00)	[-.00; .00]
-2 Res Log Like	2195.6		2244.9		2523.0		2523.9		2362.1		1828.1	

Note. ICP = individuals with chronic pain, -2 Res Log Like = value of -2 times Residual Log Likelihood. CI = confidence interval. Results displayed in the first column of each outcome variable are analyses without controlling for ICP pain intensity. Results in the third column of each outcome variable represent analyses including ICP pain intensity. *p<.05; **p<.01; ***p<.001.

The mediating role of need satisfaction and need frustration

Next, we tested whether the associations between partners' daily autonomous helping motivation and partner and ICP outcomes were mediated by partners' and ICPs' relationship-based need satisfaction and need frustration, respectively. For the a-paths we tested two separate models, one involving partners' or ICPs' need satisfaction (a1-paths) and one involving need frustration (a2-paths). In each of these models we controlled for participants' need satisfaction and frustration the previous day. Second, we simultaneously tested whether the change in need satisfaction (b1-paths) and frustration (b2-paths) was related with partner outcomes and ICP outcomes. In each model we controlled for the effect of ICPs' daily pain intensity, when testing a- and b-paths. With regard to the ICP outcomes, the presence of the total effect (*c*) of partners' helping motivation upon ICP outcomes was not a prerequisite for testing indirect effects (Loeys, Moerkerke, & Vansteelandt, 2015). Robustness of the mediated effects against unmeasured common causes (or confounders) of the mediator and outcome was assessed by means of sensitivity analyses. We found that for our mediated effects relatively strong effects of such unmeasured time-varying common causes of M (i.e. ICPs' need satisfaction/frustration) and Y (i.e. different ICP outcomes) are needed to yield zero (or non-significant) mediated effects. To investigate the significance of the indirect effect (*a*b*) of helping motivation on changes in partner or ICP outcomes through changes in psychological need satisfaction and need frustration, respectively, we performed a Sobel test (Baron & Kenny, 1986). Results of all mediation analyses are displayed in Table 4 (partner outcomes) and Table 5 (ICP outcomes).

Table 4. The Mediating Role of Need Satisfaction (NS) and Frustration (NF) in the Relations between Partners' Helping Motivation and Partner Outcomes

Effect	Positive Affect			Negative Affect			Conflict			Helping Exhaustion		
	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI
a1	.23 ***	.03	[.17; .29]	.23 ***	.03	[.17; .29]	.23 ***	.03	[.17; .29]	.23 ***	.03	[.17; .29]
b1 (NS)	.45***	.04	[.37; .53]	-.30***	.04	[-.38; -.21]	-.39***	.04	[-.47; -.30]	-.17***	.04	[-.24; -.10]
a2	-.18***	.04	[-.25; -.11]	-.18***	.04	[-.25; -.11]	-.18***	.04	[-.25; -.11]	-.18***	.04	[-.25; -.11]
b2 (NF)	-.10**	.03	[-.16; -.03]	.19***	.04	[.12; .25]	.35***	.04	[.28; .42]	.17***	.03	[.11; .23]
c'	.05	.03	[-.01; .11]	-.02	.03	[-.09; .04]	-.02	.03	[-.09; .05]	-.05	.03	[-.10; .01]
a1*b1	.11***	.02	[.07; .15]	-.07***	.01	[-.09; -.05]	-.09***	.02	[-.13; -.05]	-.04***	.01	[-.06; -.02]
a2*b2	.02**	.01	[.00; .04]	-.03***	.01	[-.05; -.01]	-.06***	.01	[-.08; -.04]	-.03***	.01	[-.05; -.01]

Note. CI = confidence interval. The a-paths represent the relation between helping motivation and need satisfaction (a1) and frustration (a2) (while controlling for need satisfaction and frustration the previous day); the b-paths represent the relation between need satisfaction (b1) and need frustration (b2) and partner outcomes (while controlling for the outcome at the previous day); the c´-path is the relation between helping motivation and the different partner outcomes when b1 and b2 are taken into account. In each model we controlled for ICP pain intensity. *p<.05; **p<.01; ***p<.001.

Table 5. The Mediating Role of Need Satisfaction (NS) and Frustration (NF) in the Relations between Partners' Helping Motivation and ICP Outcomes

	ICP Outcomes																
Effect	Positive Affect			Negative Affect			Conflict			Satisfaction Received Help			Amount Received Help			Disability		
	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI
a1	.15***	.03	[.09; .22]	.15***	.03	[.09; .22]	.15***	.03	[.09; .22]	.15***	.03	[.09; .22]	.15***	.03	[.09; .22]	.15***	.03	[.09; .22]
b1 (NS)	.36***	.04	[.28; .43]	-.30***	.04	[-.38; -.22]	-.32***	.05	[-.41; -.23]	.34***	.06	[.23; .46]	.27***	.06	[.16; .39]	-.12**	.04	[-.19; -.05]
a2	-.07*	.03	[-.13; -.00]	-.07*	.03	[-.13; -.00]	-.07*	.03	[-.13; -.00]	-.07*	.03	[-.13; -.00]	-.07*	.03	[-.13; -.00]	-.07*	.03	[-.13; -.00]
b2 (NF)	-.15***	.04	[-.23; -.07]	.31***	.04	[.22; .39]	.37***	.05	[.28; .46]	-.18**	.06	[-.30; -.07]	-.09	.06	[-.20; .02]	.04	.04	[-.03; .11]
c'	.00	.03	[-.06; .07]	.04	.04	[-.04; .11]	-.08*	.03	[-.15; -.00]	.05	.05	[-.05; .15]	.08	.05	[-.02; .17]	.04	.03	[-.02; .10]
a1*b1	.06***	.01	[.03; .08]	-.05***	.01	[-.07; -.02]	-.05***	.01	[-.07; -.03]	.05***	.01	[.02; .08]	.04***	.01	[.02; .07]	-.02**	.01	[-.01; -.03]
a2*b2	.01	.01	[-.00; .02]	-.02	.01	[-.04; .00]	-.03*	.01	[-.05; -.01]	.01	.01	[-.00; .03]	.01	.00	[-.00; .02]	.00	.00	[-.00; .01]

Note. CI = confidence interval. The a-paths represent the relation between helping motivation and need satisfaction (a1) and frustration (a2) (while controlling for need satisfaction and frustration the previous day); the b-paths represent the relation between need satisfaction (b1) and need frustration (b2) and ICP outcomes (while controlling for the outcome at the previous day); the c´-path is the relation between helping motivation and the different ICP outcomes when b1 and b2 are taken into account. In each model we controlled for ICP pain intensity. *p<.05; **p<.01; ***p<.001.

Results showed that partners' daily helping motivation was significantly related to a change in partners' day-to-day need satisfaction (a1-path) and need frustration (a2-path). For all outcome variables, the change in partners' need satisfaction and frustration significantly related to a change in partners' daily positive and negative affect, conflict and feelings of helping exhaustion (b1- and b2-paths). Furthermore, the initial associations between helping motivation and the different outcomes were no longer significant. Results showed that all indirect effects were significant, indicating that partners' helping motivation contributed to changes in partners' daily outcomes through the improvement of partners' need satisfaction (a1*b1-path) and a decrease of partners' need frustration (a2*b2-path) (see Table 4).

The findings among ICPs were very similar. Specifically, partners' daily helping motivation also significantly related to a change in ICPs' day-to-day need satisfaction (a1-path) and need frustration (a2-path). Subsequently, we simultaneously tested whether changes in ICPs' need satisfaction and frustration were related to ICP outcomes. For all outcome variables, changes in ICPs' need satisfaction (b1-paths) and frustration (b2-paths) strongly related in the hypothesized direction to changes in ICPs' daily outcomes. Only changes in ICPs' need frustration did not contribute to changes in the amount of received help and disability. The initial association between helping motivation and conflict (c') remained present, while for the amount of received help it was no longer significant. Finally, results showed that all indirect effects through ICPs' need satisfaction were significant, while only 1 out of 6 indirect effects through ICPs' need frustration was significant. For ICPs' daily conflict, the effect of partners' helping motivation was partially mediated by ICPs' need satisfaction and frustration, while for daily amount of received help, this effect was fully mediated by ICPs' need satisfaction but not by ICPs' need frustration. For the other outcomes, there was only an indirect effect through ICPs' need satisfaction, indicating that partners' helping motivation contributed to a decrease in

ICPs' daily negative affect and disability, and to an improvement in ICP's daily positive affect and satisfaction with received help through improvements in ICPs' need satisfaction (see Table 5)[5].

DISCUSSION

Coping with chronic pain represents a relational and interdependent process (Bodenmann, Meuwly, & Kayser, 2011). As partners are a primary source of support, it is crucial to understand when partners' support provision is experienced as helpful and entails benefits for partners' and ICPs' personal well-being as well as the couple's relational functioning. Although support often yields benefits, that is not necessarily the case. Indeed, support may be portrayed as a double-edged sword (Revenson, Schiaffino, Majerovitz, & Gibofsky, 1991), with multiple studies pointing to both advantages and costs associated with social support in the context of intimate relationships (Rafaeli & Gleason, 2009). To shed light on the effects of provided help on both the partner and the ICP, this study examined partners' underlying motives for helping, thereby drawing upon Self-Determination Theory (SDT). With regard to partner outcomes, studies have shown elevated distress (Leonard, Cano, & Johansen, 2006), relational dissatisfaction (Geisser, Cano, & Leonard, 2005) and caregiver exhaustion (Jones et al., 2011) among partners of ICPs. It is yet unknown why some partners of ICPs suffer more than others. Herein, we suggested that a motivational perspective may be useful, as partners' different reasons for

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[5] On an exploratory basis, we analyzed whether the presence of chronic pain in partners moderated the examined associations. Only for 3 out of 14 outcome variables (4 partner outcomes + 6 ICP outcomes + partner and ICP need satisfaction/frustration) a significant moderation was found. Partners' daily autonomous helping motivation related positively to improvements in positive affect and decreases in negative affect, only for those partners having chronic pain themselves (B=.28 (.05)***, CI=[.19; .38] and B=-.18 (.05)*, CI=[-.28; -.09]). Also, the effect of partners' helping motivation on partners' need satisfaction was stronger for partners with chronic pain (B=.31 (.04)***, CI=[.24; .39]) compared with partners without chronic pain (B=.17 (.04)***, CI=[.09; .25]).

engaging in helping behavior may yield differential correlates, not only for the partners themselves but also for ICPs (Kindt et al., 2015; Weinstein & Ryan, 2010). We reasoned that on days that partners are volitionally committed to provide help (i.e. *autonomously* motivated), they may display a more open and receptive attitude to the ICP's perspective, resulting in improved need satisfaction within the relationship and, hence, better individual and relational outcomes. In contrast, on days that partners feel pressured to provide help (i.e. *controlled* motivated), they may be more narrowly focused on their own agenda and needs, with such a tunnel view hampering their responsiveness to ICPs' preferences and precluding experiences of need satisfaction.

Daily autonomous helping motivation relates to daily functioning

The current findings indicate that partners' daily autonomous, relative to controlled, helping motivation was, as hypothesized, associated with partners' daily personal, relational, and help-related functioning, even when controlling for partners' functioning the previous day and taking into account ICPs' levels of pain intensity. Specifically, on days where partners reported higher autonomous motives for helping, they reported better personal functioning, as indexed by improved positive affect and decreased negative affect, less relational conflicts and feeling less exhausted due to helping. This indicates that, if partners do not experience pressure, either externally or internally, but rather are committed to provide help and even enjoy doing so, they feel better by the end of the day and encounter fewer tensions within their relationship. These results are in line with previous cross-sectional studies showing that autonomous reasons for helping your partner with chronic pain or illness are associated with better individual and relational functioning of the caregiving partner (Kim et al., 2008; Kindt et al., 2015). The present study significantly extends previous research by showing that fluctuations in partners' helping motivation related to improvements or decreases in daily personal, relational, and help-related

functioning. Another objective of the present study was to examine satisfaction and frustration of partners' psychological needs as critical mechanisms in the association between partners' daily helping motivation and partner outcomes. Daily helping motivation was found to impact partner outcomes through changes in partners' need satisfaction and frustration.

Interestingly, our findings further demonstrated that partners' daily helping motivation also related to changes in ICP outcomes. Specifically, day-to-day variation in partners' autonomously motivated helping was mainly indirectly and positively related to ICPs' positive affect, satisfaction with and amount of received help, while being negatively related to ICPs' negative affect, relational conflicts and disability via improvements in ICPs' need satisfaction. ICPs' need frustration only played an explanatory role for changes in ICP-reported relational conflict. These findings are in line with previous studies involving strangers showing that the benefits of autonomous helping motivation radiate towards recipients of help (Weinstein & Ryan, 2010) and that ICPs' fulfillment of needs appear to be a key factor in explaining their daily functioning (e.g., Patrick, Knee, Canevello, & Lonsbary, 2007; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). The current findings slightly deviate from a previous cross-sectional study among chronic pain couples due to a lack of interaction between helping motivation and pain intensity. In that previous study, partners' helping motivation was only associated with ICPs' relationship functioning in ICPs reporting high intensity pain (Kindt et al., 2015). In the present study, no moderation effects of pain intensity were found, which may be due to the difference in measurement of pain intensity (i.e., pain during past 6 months versus pain during past day). Instead, daily autonomous helping motivation (indirectly) related to ICP outcomes regardless of experienced pain that day, even though daily pain clearly occurred as an important predictor of ICPs' daily functioning. Future research should replicate these results to examine whether partners' helping motives are indeed relevant for ICPs with higher and lower levels of pain. Presumably, on a specific day, the ICP may sense

the sincerity of the autonomously provided help and directly benefit from it, even when (s)he experiences little pain.

Theoretical and practical implications

Results of this study add important information to our understanding of partners as key players in dealing with pain. By using a motivational framework, we can look beyond the effects of partners' behavioral responses' to pain behavior. Although this study mainly includes couples with long lasting relationships, partner's motivation for providing help seems to vary considerably on a day-to-day basis. Indeed, although most of the helping motivation appeared to vary between partners, with some partners being on average more autonomously motivated than others, there was also substantial variation within partners. Thus, consideration of these within-person variations attests to the adoption of a dynamic approach to the support process.

Further, given the strongly held recognition that pain is a bio-psycho-*social* phenomenon (Hadjistavropoulos et al., 2011), understanding the underlying mechanisms of partners' caregiving role is essential. The SDT-perspective seems useful in this regard as it posits that support effectiveness may depend on the extent to which it nurtures or thwarts universal psychological needs for autonomy, competence, and relatedness (Weinstein, 2014). Using this theory within pain research has the potential of providing more clinically relevant directions of how partners can support the ICP, both at its own and the ICP's advantage. Indeed, the way in which partners provide support may help to explain the relation between autonomous helping motivation and experienced need satisfaction in both the partner and ICP, an issue that deserves greater attention in future work. Partners can be more or less need supportive toward the ICP, that is, they can be more or less controlling (vs. autonomy supportive), more or less cold or rejecting (vs. relationally supportive), more or less critical or negative (vs. competence supportive) (Weinstein, 2014).

Although the current study primarily addressed the role of partners in predicting ICPs' functioning, the impact is likely to be bidirectional. Indeed, other researchers also point to the importance of reciprocity of support in chronic pain couples (Rafaeli & Gleason, 2009; Weinstein, 2014). This mutuality of support is also covered by the idea of "dyadic coping", which became an important concept in the literature of couples dealing with chronic diseases (Bodenmann, Pihet, & Kayser, 2006; Meier, Bodenmann, Moergeli, & Jenewein, 2011; Traa, De Vries, Bodenmann, & Den Oudsten, 2014). If we want to protect partners of ICPs against a "helping burnout", we should also pay attention to the role of ICPs in supporting need satisfaction in partners and eliciting particular motives for help. For instance, guilt-inducing statements may awaken more pressured forms of help and engender greater need frustration, with resulting negative consequences for the partner.

Limitations, future research and conclusion

This study has several limitations. First, we were unable to address causality. Although conclusions about same-day associations were strengthened by accounting for yesterday's level of partners' and ICPs' daily outcomes, temporal ordering could, however, not be established. To establish a causal pathway, experimental research is needed. Second, data represent partner and ICP self-reports of daily behavior. To overcome this limitation observational research is necessary to reveal differences in the type, the amount, and the quality of help provided by partners depending on their motivation. Hence, future research can provide more insights on how motivation is translated into actual behavior and investigate how couples communicate (Edlund, Carlsson, Linton, Fruzzetti, & Tillfors, 2015) about pain and helping. Third, the included couples were all Caucasian, in a stable relationship, with high average marital satisfaction, which limits generalizability of our findings. Also, we cannot exclude that social

desirability may artificially drive some of the observed associations, a tendency that may be controlled for in future work.

In conclusion, this study showed that daily fluctuations in partners' helping motivation related to daily fluctuations in partners' and ICPs' daily functioning through, respectively, daily satisfaction and frustration of partners' and ICPs' basic psychological needs. These findings underscore the importance of a differentiated and dynamic approach towards the support process. Rather than merely considering the fact that partners provide help, it seems critical to take into account the motives underlying helping behavior. This may help us understand when and why provided help yields benefits, for both the support provider (i.e. romantic partner) and the support receiver (i.e. ICP). Future studies may further investigate ways to enhance a need supportive coping style among couples dealing with chronic pain. Given the critical role of autonomous helping motivation, future research may also examine which factors promote autonomous motives and prevent partners from becoming controlled motivated in the helping process.

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CHAPTER 5

THE EFFECTS OF PARTNERS' HELPING MOTIVATION ON CHRONIC PAIN PATIENTS' FUNCTIONING OVER TIME[1]

Providing help to your partner with pain may not always be beneficial. Based on Self-Determination Theory, the extent to which these helping responses are supportive for the basic psychological needs of the individual with chronic pain (ICP) and the motives underlying these helping responses are important to consider. The present study investigated temporal associations between partners' helping motivation, ICPs' psychological needs and ICPs' functioning across time. 141 couples, with at least one partner having chronic pain, participated in this study and completed three waves of questionnaires at three time points spread across 6 months. Partners reported on their helping motivation, whereas ICPs reported on their relationship-based need satisfaction and frustration, and their functioning (i.e. wellbeing, psychological distress, and disability). Cross-lagged analyses provided support for a direct association between partners' autonomous helping motivation and ICPs' wellbeing, with ICPs' need frustration as an intervening variable. Further, although not directly associated, an indirect association, via ICPs' need frustration, was found between partners' helping motivation and ICPs' psychological distress. The link between partners' helping motivation and ICPs' disability was in the reverse direction with ICPs' disability predicting decreases in partners' autonomous helping motivation and ICPs' need satisfaction. Implications for research and clinical practice are discussed.

INTRODUCTION

Because partners of individuals with chronic pain (ICP) differ considerably in their helping responses, with resulting implications for ICP's functioning, various attempts have been undertaken to categorize helping responses of close others in terms of its expected impact upon sufferer's pain experience and behavior (e.g., Fordyce, 1976). Emerging research now suggests that one particular type of helping response cannot, in and of itself, be considered adaptive or maladaptive (e.g., Bolger & Eckenrode, 1991; Bolger, Foster, Vinokur, & Ng, 1996; Bolger, Zuckerman, & Kessler, 2000; Vervoort & Trost, 2017). Drawing on Self-Determination Theory (SDT, Deci & Ryan, 2000), we argue that to fully understand the actual consequences of others' helping responses, it is critical to consider 1) the extent to which these responses are supportive for the basic *psychological needs* of the person in pain (Deci & Ryan, 2000; Rafaeli & Gleason, 2009) and 2) the *motives* underlying these helping responses (Kindt et al., 2015; Kindt, Vansteenkiste, Loeys, & Goubert, 2016).

Within SDT, two broad types of *motivation* are distinguished; i.e. autonomous and controlled type of motivation (Vansteenkiste, Lens, & Deci, 2006). When autonomously motivated, individuals help others because they derive inherent satisfaction from the act of helping itself or because they see the value of their helping behavior, either for themselves or for the recipient of help. In contrast, when controlled motivated, help is provided to avoid criticism from the help recipient or out of guilt feelings and pressured loyalty towards the recipient of help. In other words, controlled motivated help is phenomenologically experienced as a "should", whereas autonomously motivated help more willingly emanates from the person's interests and commitments. Available research indicates that both the help provider (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006; Feeney & Collins, 2003; Kim, Carver, Deci, & Kasser, 2008; Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002; Millette & Gagné, 2008; Patrick, Knee, Canevello, & Lonsbary, 2007; Ryan et al., 1989) and the recipient of help (Weinstein &

Ryan, 2010) benefit more when the help originates from autonomous instead of controlled motives. Recently, motives behind pain-related social support have received initial attention. Daily autonomous helping motivation yielded considerable daily benefits for ICPs, with partners' daily autonomous helping motives (in)directly relating to in ICPs' affective (e.g., improved positive affect), relational (e.g., decreased conflict) and help-specific (e.g., increased satisfaction with received help) functioning (Kindt et al., 2016). Importantly, these benefits occurred because ICPs reported greater satisfaction and less frustration of their *basic psychological needs* for autonomy, competence and relatedness (Deci & Ryan, 2000) on days their partners provided autonomously motivated help (Kindt et al., 2016). Basic psychological needs are described in SDT as three inherent and fundamental nutriments for ongoing psychological growth and wellbeing (Deci & Ryan, 2000), that can get supported or thwarted to various degrees within romantic relationships.

The present study is the first to assess the temporal associations between partners' helping motivation and ICPs' functioning across time, with ICPs' relationship-based need satisfaction and frustration as intervening variables. Specifically, it is examined whether partners' autonomous helping motivation at T1 relates to changes in ICPs' relationship-based need satisfaction and frustration at T2 (i.e. three months later), which, in turn, relates to changes in ICPs' wellbeing, illbeing (i.e. psychological distress) and disability at T3 (i.e. six months later). We expect that a) partners' autonomous helping motives will relate to an increase in ICPs' satisfaction and a decrease in ICPs' frustration of relationship-based needs, and b) that ICPs' need satisfaction will relate to enhanced wellbeing and diminished illbeing and disability, whereas opposite findings are expected for ICPs' need frustration.

METHOD

Study design & procedure

The present study is part of a larger study, the "Helping Motivation Diary and Longitudinal Study" (HMDAL-Study), among ICPs and their partner, which comprises, apart from the longitudinal study that is reported herein, also diary assessments (see Kindt, Vansteenkiste, Cano, & Goubert, 2017; Kindt et al., 2016). Participants who gave their agreement to be informed about studies performed at our lab were contacted by telephone (1) to receive more information about the present study and (2) to assess inclusion criteria. If both partners in a couple reported having chronic pain, the individual with the longest pain duration was chosen as the ICP. ICPs and their partner were asked to complete questionnaires at three time points, spread across 6 months. The informed consents and baseline questionnaires (Time 1) were administered via a home visit. Both partners received a link and a personal code for completing the questionnaire online on a survey tool called LimeSurvey. When there was no computer or internet available, or when participants indicated having no experience with computer/internet, they received a paper version. At T1 (total $N = 140$ ICPs and 140 partners), 39 ICPs (27.86%) and 31 partners (22.14%) chose to use the paper versions of the questionnaires. As a sign of appreciation, all couples received a fee of 30 euros after completing the questionnaires at Time 2 and Time 3. To enhance completion rates we reminded participants by means of e-mail and/or telephone. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Participants

Participants were couples, recruited through the Flemish Pain League (FPL), an umbrella organization for ICPs, and the Flemish League for Fibromyalgia Patients (FLFP), which is an organization specifically oriented to individuals with fibromyalgia. In total, 141 couples participated in the longitudinal study, with 97 couples being members of the FPL (for

more recruitment details see (Kindt et al., 2016) and 44 being members of the FLFP (for more recruitment details see (Kindt et al., 2017). Inclusion criteria for participation of individuals with chronic pain (ICPs) in the present study were (1) having chronic pain for at least 3 months, (2) physically living together with a partner for at least one year, and (3) being sufficiently proficient in Dutch.

Initially, 141 couples took part in the "HMDAL-study", but only data of 140 ICPs (data of one ICP got lost via regular mail) and 140 partners (one partner was not at home during the home visit of Time 1) were collected. For Time 1, complete data were available for 139 couples (see Figure 1 for an overview). At Time 2 (3 months later than Time 1), 134 partners and 134 ICPs participated again. At Time 3 (6 months later than Time 1), 131 partners and 129 ICPs participated.
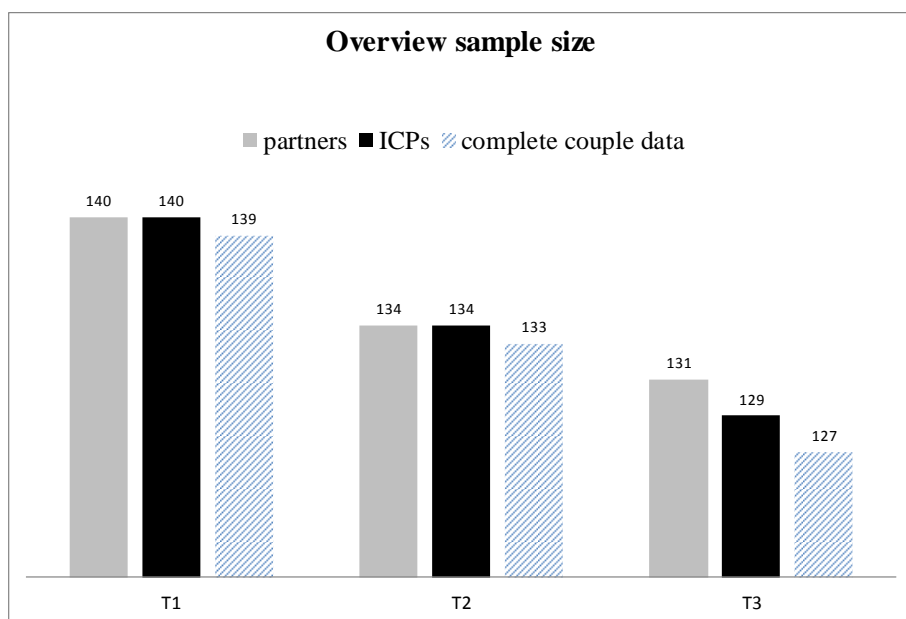

Figure 1. Overview of partner, ICP and complete couple data at Time 1, 2 and 3.

At Time 1, the majority of ICPs were female ($N = 115$; 82.1%); the mean age of ICPs and their partner (80.7% males) was 52.38 years ($SD = 11.72$) and 53.61 years ($SD = 12.02$), respectively. All couples were heterosexual (except for two) and Caucasian. More than a third of the sample (36.9% of ICPs; 34.3% of partners) reported having followed education beyond the age of 18. Almost all couples were married or legally cohabiting (81.5%), with the mean relationship duration being 25.22 years ($SD = 14.96$). The majority of partners were employed ($N = 91$; 65%), while only 20.7% of ICPs ($N = 29$) were employed. Almost all ICPs reported pain in more than one location ($M = 4.02$, $SD = 1.68$; range 1–7), with pain in the back (90.1%), neck (75.2%), and lower extremities (62.1%) being reported most frequently. Mean pain duration was 15.49 years ($SD = 13.15$). On a scale from 0 to 10, ICPs reported a mean pain intensity of 6.90 ($SD = 1.41$) and a mean disability of 6.50 ($SD = 1.94$). Fifty-six partners (i.e. 40.3%) also reported pain complaints during the past three months (which is similar to other studies with chronic pain couples, e.g., Issner, Cano, Leonard, & Williams, 2012). Paired-samples t-tests showed that pain duration ($M = 9.84$, $SD = 11.87$), pain intensity ($M = 4.30$, $SD = 1.72$) and disability ($M = 2.77$, $SD = 2.21$) were significantly lower in partners compared to the ICPs (all ps <.05).

Measures

Helping motivation

At all measurement times (Time 1, Time 2, Time 3), partners' helping motivation was assessed by 20 items measuring reasons for helping or supporting one's partner in pain (Kindt et al., 2015), adapted from the Motivation to Help Scale (MHS) (Weinstein & Ryan, 2010). Partners reported how true these motives for helping were for them on a 7-point scale ranging from '1' (not at all true) to '7' (totally true). Four different types of motivation were distinguished: external motivation (5 items, e.g., "because my partner would criticize me"), introjected motivation (5 items, e.g.,

"because I would feel guilty if I didn't help"), identified motivation (5 items, e.g., "because I think it is important to help my partner") and intrinsic motivation (5 items, e.g., "because I enjoy helping my partner"). Items of external and introjected motivation were summed up to represent controlled motivation to help, whereas items of identified and intrinsic motivation were summed to represent autonomous motivation to help.[2] Cronbach's alpha's for Time 1, Time 2 and Time 3 were .88, .87, .90 for autonomous helping motivation and .78, .81, .80 for controlled motivation, respectively. In line with previous work (e.g., Kindt et al., 2016; Weinstein & Ryan, 2010), an overall index reflecting the Relative Autonomous Helping Motivation (i.e. RAHM) was calculated by subtracting controlled motivation from autonomous motivation scores.

Relationship-based Need Satisfaction and Frustration

ICPs' need satisfaction and frustration were assessed at each time point with the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) adapted for use within intimate relationships (see Vanhee, Lemmens, Stas, Loeys, & Verhofstadt, 2016; Vanhee, Lemmens, & Verhofstadt, 2016). The 24 items were scored on a 5-point Likert scale ranging from 1 (completely untrue) to 5 (completely true). Higher scores reflect higher levels of need satisfaction or frustration. All items started with "In the relationship with my partner" and were for example: "…, I can freely take decisions" (i.e. autonomy satisfaction), "…, I am confident that I can do things right" (i.e. competence satisfaction), "…, I feel that s/he cares about me" (i.e. relatedness satisfaction), "…, most of the things I do feel like I have to" (i.e. autonomy frustration), "…, I have serious doubts about whether I can do things well" (i.e. competence frustration), and "…, I sometimes have the impression that s/he dislikes me"), (i.e. relatedness frustration). Participants' relationship-based need satisfaction

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[2] Factor analyses on the helping motivation items for time 1, 2 and 3, thereby using a promax rotation, demonstrated that 2 factors explained on average 47.43% of the variance. More information about these analyses is provided in the appendix.

and frustration scores were computed by averaging scores for all items included in each of the three subscales for satisfaction or frustration, respectively. Need satisfaction showed good reliability (Time 1 α=.84; Time 2 α=.85; Time 3 α=.88); also need frustration had a good internal consistency (Time 1 α=.85; Time 2 α =.88; Time 3 α=.90).

Wellbeing

To measure subjective "*wellbeing*", it is recommended to include three different aspects: a cognitive evaluation of one's life, and positive and negative emotions (OECD, 2013). The overall quality of life (QoL) in ICPs was measured every time using a linear analogue scale (Moons, Van Deyk, De Geest, Gewillig, & Budts, 2005). This is a vertical graded, 10 cm line, ranging from "0" (the worst imaginable quality of life) to "100" (the best imaginable quality of life). The use of this rating scale allows ICPs to give a rating of their overall perceived quality of life. The Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) is widely used to measure positive (10 items; e.g., enthusiastic) and negative affect (10 items; e.g., upset). ICPs completed this questionnaire at each time point. Each item was rated on a 5-point scale ranging from '1' (very slightly) to '5' (extremely) to indicate the extent to which the affect was experienced during the past two weeks. Cronbach's alphas in the current study were .88, .90 and .88 for positive affect for Time 1, 2 and 3, respectively. For negative affect, Cronbach's alphas were .88, .92 and. 92 for Time 1, 2 and 3, respectively. The scores for the overall quality of life, positive and negative affect were used as indicators for our latent variable "*wellbeing*" (for a similar approach, see Diener, Suh, Lucas, & Smith, 1999; Kindt et al., 2015).

Illbeing

To measure ICP's "*Illbeing*" (i.e. psychological distress) we used the subscales of the Dutch 21-item version (De Beurs et al., 2001) of the Depression Anxiety Stress Scale (DASS) (Lovibond & Lovibond, 1995), which is designed to measure the negative emotional states of depression,

anxiety and stress during the past week. Each of the three DASS-scales contains 7 statements that are to be rated on a four-point Likert Scale ranging from "0" (not at all) to "3" (very much), e.g., "I was unable to become enthusiastic about anything" (depression); "I felt scared without any good reason" (anxiety) or "I found it difficult to relax" (stress). Cronbach's alphas in the current study were .88, .90, .91 for depression, .80, .82, .85 for anxiety and .88, .91 and.91 for stress for Time 1, 2 and 3, respectively.

Pain intensity and disability

ICPs' pain intensity at T1 and disability (assessed at all three time points) were assessed with the Graded Chronic Pain Scale (GCPS) (Von Korff, Ormel, Keefe, & Dworkin, 1992). A pain intensity score was calculated by averaging three ratings for pain intensity (current pain, average pain, and worst pain in the past six months), each on a scale from '0' (no pain) to '10' (worst imaginable pain). In the present study, Cronbach's alpha was .76. A disability score was computed by calculating the mean score out of three items assessing the interference of pain with activities during the last 3 months (daily activities; recreational, social and family activities; work or household activities), which were also rated on a scale from "0" (no interference) to "10" (impossible to carry out activity). Cronbach's alphas were .88, .92, .92 for Time 1, 2 and 3, respectively.

RESULTS

Descriptive Statistics and Preliminary Analyses

Means, standard deviations, and correlations among the study variables are presented in Table 1. By doing a confirmatory factor analysis in MPlus, the factor scores for ICP wellbeing and illbeing were saved as new variables and included in Table 1 (see information about measurement model below).

Table 1. Means (M), Standard Deviations (SD) and Pearson Correlations among the Measured Variables

	Time 1						Time 2						Time 3						
	RAHM (T1)	NS (T1)	NFR (T1)	WB (T1)	IB (T1)	DIS (T1)	RAHM (T2)	NS (T2)	NFR (T2)	WB (T2)	IB (T2)	DIS (T2)	RAHM (T3)	NS (T3)	NFR (T3)	WB (T3)	IB (T3)	DIS (T3)	PI (T1)
RAHM	-	.31***	-.27**	.11	-.18*	-.01	.73***	.28**	-.29**	.16†	-.20*	-.04	.73***	.23*	-.25**	.14	-.18*	.08	-.05
NS		-	-.66***	.43***	-.39***	-.10	.24**	.71***	-.66***	.35**	-.36***	-.11	.19*	.74***	-.57***	.48***	-.40***	-.04	-.10
NFR			-	-.35***	.46***	.21*	-.20*	-.57***	.71***	-.36**	.45***	.15†	-.21*	-.54***	.68***	-.38***	.47***	.07	.18*
WB				-	-.60***	-.52***	.08	.41***	-.35***	.89***	-.53***	-.42***	.05	.31***	-.32***	.86***	-.54***	-.33***	-.40***
IB					-	.35**	-.14	-.32***	.39***	-.54***	.84***	.20*	-.13	-.30**	.36***	-.58***	.81***	.22*	.32***
DIS						-	.02	-.08	.11	-.52***	.30***	.68**	.02	-.05	.09	-.39***	.24**	.64***	.61***
RAHM							-	.25**	-.31***	.15†	-.16†	-.08	.78***	.25**	-.31***	.14	-.19*	-.03	-.19*
NS								-	-.73***	.45***	-.37***	-.10	.15†	.76***	-.66***	.51***	-.43***	.03	.09
NFR									-	-.32***	.47***	.14	-.26**	-.74***	.83***	-.40***	.51***	.01	.05
WB										-	-.57***	-.54***	.13	.30**	-.33***	.83***	-.53***	-.37***	-.45***
IB											-	.29**	-.19*	-.32***	.45***	-.54***	.83***	.23**	.33***
DIS												-	-.12	-.11	.20*	-.40***	.24**	.64***	.44***
RAHM													-	.17†	-.24**	.13	-.22*	-.02	.13
NS														-	-.69***	.45***	-.42***	.04	.04
NFR															-	-.41***	.57***	.05	.14
WB																-	-.64***	-.32***	-.31***
IB																	-	.23**	.26**
DIS																		-	.46***
M	19.75	45.25	26.36	-.00	-.00	6.50	19.74	45.37	25.46	-.00	-.00	6.48	19.52	44.84	25.68	-.00	.00	6.27	6.90
SD	12.77	7.13	8.20	9.88	7.07	1.94	13.82	7.39	8.82	11.53	7.79	2.02	13.89	8.10	9.36	8.12	8.13	2.13	1.41

Note. RAHM = partners' relative autonomous helping motivation, NS = ICPs' relationship-based need satisfaction, NFR = ICPs' relationship-based need frustration, WB = ICPs' wellbeing, IB = ICPs' illbeing, ICPs' DIS = ICPs' disability, with ICP= individual with chronic pain. PI= pain intensity. † p < .10, *p < .05, **p < .01, ***p < .001.

Within each time point, partners' relative autonomous helping motivation correlated positively with ICPs' relationship-based need satisfaction and negatively with ICPs' relationship-based need frustration and illbeing, while being unrelated to ICPs' wellbeing and disability. ICPs' Need-based experiences related in the hypothesized ways to ICP outcomes, with need satisfaction yielding a more desirable and need frustration an undesirable pattern of correlates, with the exception of disability to which none of both was related (only at T1 ICP need frustration was positively correlated with ICP disability; $r=.21$, $p<.05$). This pattern of correlates also tended to emerge across measurement waves. Partners' relative autonomous helping motivation at T1 was negatively correlated with ICPs' illbeing at T3, whereas for ICPs' wellbeing and disability at T3 no significant correlations were found. As expected, partners' helping motivation (T1) correlated positively with ICPs' relationship-based need satisfaction (T2) and negatively with ICPs' need frustration (T2). Further, relationship-based need satisfaction (T2) correlated positively with wellbeing and negatively with illbeing at T3. The opposite pattern of correlations was observed between ICPs' need frustration and the outcome measures at T3. Only for disability (T3), no significant correlations were found with ICPs' relationship-based need satisfaction and frustration (T2).

Next, preliminary analyses were conducted to examine differences in the study variables as a function of ICP's sex, presence of chronic pain in both versus a single partner, partner and ICP age, relationship duration, ICP pain duration and ICP pain intensity. A first MANCOVA examined the effects of these variables on partners' helping motivation measured at Time 1, 2 and 3. Although a significant multivariate effect for ICP pain duration (Wilk's Lambda $= .96$; $F(3, 113) = 2.71$, $p < .05$) was obtained, subsequent univariate effects revealed no significant effects when outcomes were considered in isolation. A second MANCOVA, involving ICPs' relationship-based need satisfaction and frustration at all three measurement waves, revealed a significant multivariate effect for ICP pain intensity (Wilk's

Lambda = .82; $F(6, 112) = 4.11$, $p < .01$), with only one univariate effect being present for ICPs' need satisfaction at Time 2 ($F(1, 117) = 5.81$, $p < .05$). ICPs with higher pain intensity at Time 1 reported less need satisfaction at Time 2 ($r = -.19$, $p < .05$). A third MANCOVA, involving the various indicators of ICPs' wellbeing across measurement moments, revealed a significant multivariate effect for ICP pain intensity (Wilk's Lambda = .70; $F(9, 108) = 5.19$, $p < .01$). Univariate effects for ICP pain intensity were significant for ICPs' QoL ($F(1, 116) = 8.14$, $p < .01$) and positive affect ($F(1, 116) = 9.02$, $p < .01$) at Time 1, for ICPs' QoL ($F(1, 116) = 31.41$, $p < .01$), positive affect ($F(1, 116) = 15.79$, $p < .01$) and negative affect ($F(1, 116) = 10.44$, $p < .01$) at Time 2 and for ICPs' QoL ($F(1, 116) = 7.63$, $p < .01$) at Time 3. The direction of the effect was similar in each of these cases, with ICPs with higher pain intensity at Time 1 reporting lower QoL at Time 1 ($r = -.26$, $p < .01$), Time 2 ($r = -.44$, $p < .01$) and Time 3 ($r = -.23$, $p < .01$), lower positive affect at Time 1 ($r = -.29$, $p < .01$) and Time 2 ($r = -.31$, $p < .01$) and higher negative affect at Time 2 ($r = .29$, $p < .01$). A fourth MANCOVA examined the effects on the indicators of ICPs' illbeing as measured at Time 1, 2 and 3. No multivariate effects were found in this analysis. A fifth and final MANCOVA examined the effects on the indicators of ICPs' disability as measured at Time 1, 2 and 3. A significant multivariate effect was found for ICP pain intensity (Wilk's Lambda = .62; $F(3, 116) = 23.95$, $p < .01$). Univariate effects for ICP pain intensity were significant for ICPs' disability ($F(1, 126) = 68.52$; 32.10; 36.17, all $ps < .01$) at Time 1, 2 and 3, respectively. ICPs who reported higher pain intensity at Time 1 also reported higher disability at Time 1 ($r = .68$, $p < .01$), Time 2 ($r = .64$, $p < .01$) and Time 3 ($r = .61$, $p < .01$). Based on all MANCOVA analyses, we decided to control for ICP pain intensity in all subsequent analyses.

Primary analyses

To examine our research hypotheses we used Structural Equation Modelling using MPlus 7.4 (Muthén & Muthén, 2012). We evaluated model fit based on a combined consideration of the Chi-square statistic (χ^2), the

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Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root-Mean-square Residual (SRMR). The χ^2 should be as small as possible. A CFI value of .90 or higher indicates a reasonable fit, whereas an RMSEA value of .06 or lower and a SRMR value of .08 or lower indicate acceptable fit (Kline, 2010). First, a confirmatory factor analysis (CFA) was used to test the quality of the measurement model of the study constructs. Second, a series of structural models was tested, in a very conservative way by controlling for initial levels of all variables in each model and for all within-time associations.

Measurement Models.

Two separate measurement models were tested. First, the baseline model concerning ICPs wellbeing included three latent variables (i.e. wellbeing as measured at three measurement points) and 9 indicators (i.e. Quality of Life, Positive Affect, Negative Affect at three measurement points). The measurement errors of the same indicators at different measurement points were allowed to covary. The model adequately fitted the data, $\chi^2(15) = 11.05$, CFI = 1.00, RMSEA = .00, SRMR = .03. Next, a model was estimated in which the factor loadings of wellbeing were set equal across the three measurement points. Compared to the model with freely varying factor loadings the latter model did not result in a significant loss in model fit, $\Delta\chi^2(4) = 7.60$, $p > .05$. Moreover, all factor loadings were highly significant ($p < .001$), with absolute values ranging from .34 to .79 (mean = .56).

The second baseline model regarding ICPs' illbeing included three latent variables (i.e. illbeing as measured at three measurement points) and 9 indicators (i.e. depression, anxiety and stress at three measurement points). This model fitted the data adequately, $\chi^2(15) = 13.28$, CFI = 1.00, RMSEA = .00, SRMR = .02. Next, a model was estimated in which the factor loadings of illbeing were set equal across the three measurement points. Compared to the model with freely varying factor loadings the latter model did not result in a significant loss in model fit, $\Delta\chi^2(4) = 3.45$, $p > .05$. Moreover, all factor

loadings were highly significant ($p < .001$), ranging from .81 to .88 (mean = .85). In sum, evidence was obtained for two reliable and longitudinally invariant measurement models, which were used in all subsequent tests of the structural models.

For disability, no measurement model needed to be tested as disability was no latent variable, and hence, had no separate indicators.

Structural Equation Modeling.

Indirect effects model: investigating the link between partners' helping motivation, ICPs' basic psychological needs and ICPs' outcomes

Figure 2 provides an overview of the results for ICP wellbeing, where first a model is tested with ICPs' relationship-based need satisfaction (Model 1a) and second a model with ICPs' relationship-based need frustration (Model 1b) as intervening variable in the relation between partners' helping motivation and ICP wellbeing. Estimation of Model 1a ($\chi^2(80)=82.06$, RMSEA=.01, CFI=1.00, SRMR=.06) showed no significant effect of partners' helping motivation on ICPs' relationship-based need satisfaction across time. However, partners' autonomous helping motivation predicted a significant increase in ICP wellbeing at time 2 ($\beta = .14$, $p < .05$). Relationship-based need satisfaction at time 2 was unrelated to ICP wellbeing at time 3. Replacing need frustration by need satisfaction, Model 1b ($\chi^2(82) = 114.93$, RMSEA=.05, CFI=.97, SRMR=.08) indicated that partners' autonomous helping motivation predicted a significant decreases in ICP need frustration across time ($\beta = -.13$, $p < .05$), which, in turn, predicted a decreases in ICP wellbeing across time ($\beta = -.27$, $p < .05$). Further, ICP wellbeing at Time 1 also significantly related to a decrease in ICP need frustration at Time 2 ($\beta = -.34$, $p < .05$).
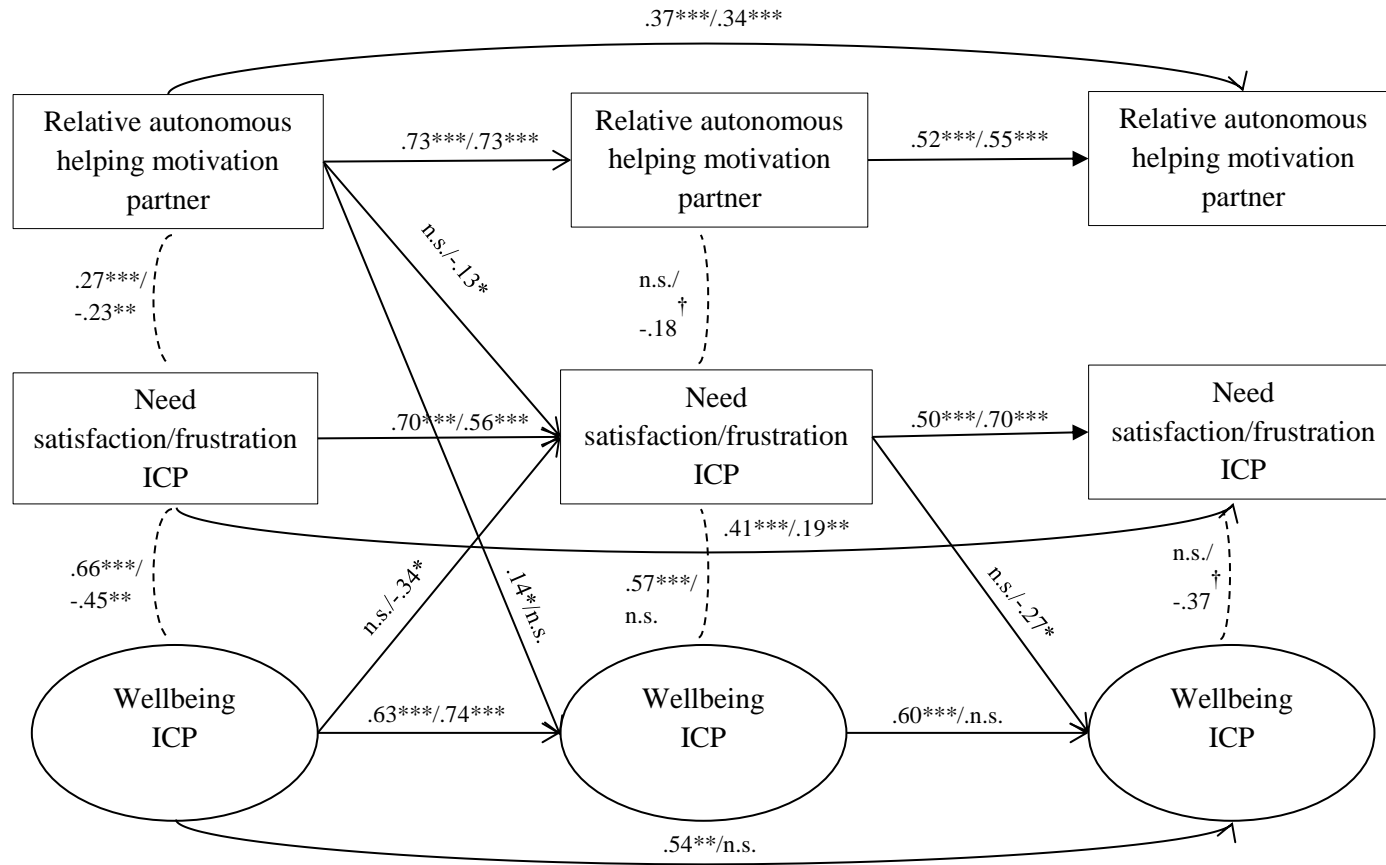
Note. Fit χ²(80)=82.06, RMSEA=.01, CFI=1.00, SRMR=.06 for model with need satisfaction (Model 1a), χ²(25)=28.42, RMSEA=.03, CFI=.99, SRMR=.04 for model with need frustration (Model 1b). We controlled for ICP pain intensity reported at T1. Coefficients shown are standardized path coefficients, † p < .10, * p < .05. ** p < .01. *** p < .001. For the sake of parsimony, only significant associations are presented.

Figure 2. Structural equation model of partners' helping motivation and ICP need-based experience and wellbeing.

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Next, we tested two models, which are graphically displayed in Figure 3, with ICP illbeing as the outcome, where the first model (i.e. Model 2a) considered ICPs' relationship-based need satisfaction and the second model (i.e. Model 2b) ICPs' relationship-based need frustration as a potential intervening variable. Estimation of Model 2a ($\chi^2(83)$=86.45, RMSEA=.02, CFI=1.00, SRMR=.06) showed no significant effect of partners' helping motivation on ICP need satisfaction. Yet, ICP need satisfaction significantly predicted a decrease in illbeing over time (β = -.22, $p < .001$). Estimation of Model 2b, involving need frustration instead of need satisfaction ($\chi^2(83)$=92.73, RMSEA=.03, CFI=.99, SRMR=.06), showed a significant effect of partners' autonomous helping motivation on decreases in ICP need frustration across time (β = -.12, $p < .05$). Further, ICP need frustration significantly related to an increase in ICP illbeing (β = .22, $p < .001$).

Next, Figure 4 provides an overview of the results for ICP disability, where the first model (i.e. Model 3a) tested ICPs' relationship-based need satisfaction and a second model (i.e. Model 3b) ICPs' relationship-based need frustration as intervening variable. As for model 3a ($\chi^2(24)$=26.39, RMSEA=.03, CFI=1.00, SRMR=.05), there was no significant effect of partners' helping motivation on ICP need satisfaction and no significant effect of ICP need satisfaction on disability. Further, disability predicted a decreases in ICP need satisfaction (β = -.09, $p < .05$) and partners' autonomous helping motivation (β = -.14, $p < .01$; for both model 3a and 3b) across time. Model 3b ($\chi^2(25)$=28.42, RMSEA=.03, CFI=1.00, SRMR=.04), involving need frustration as an intervening variable, indicated that, as noted before, that partners' autonomous helping motivation predicted a decrease in ICP need frustration across time (β = -.13, $p < .05$), but ICP need frustration failed to relate to disability across time.

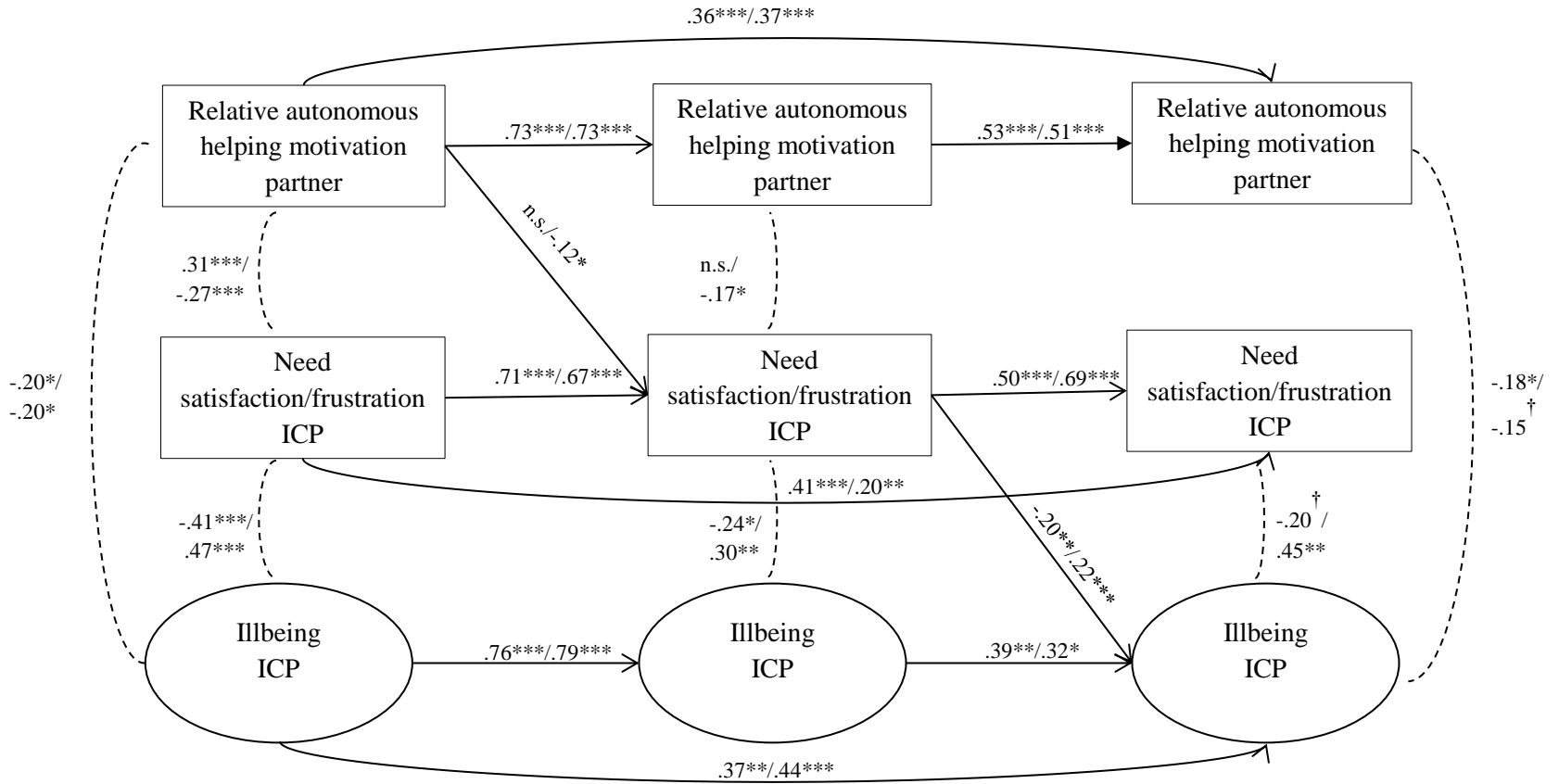*Note*. Fit χ²(83)=86.45, RMSEA=.02, CFI=1.00, SRMR=.06 for model with need satisfaction (Model 2a), χ²(83)=92.73, RMSEA=.03, CFI=.99, SRMR=.06 for model with need frustration (Model 2b). We controlled for ICP pain intensity reported at T1. Coefficients shown are standardized path coefficients. † p < .10, * p < .05. ** p < .01. *** p < .001. For the sake of parsimony, only significant associations are presented.

Figure 3. Structural equation model of partners' helping motivation and ICP need-based experience and illbeing.

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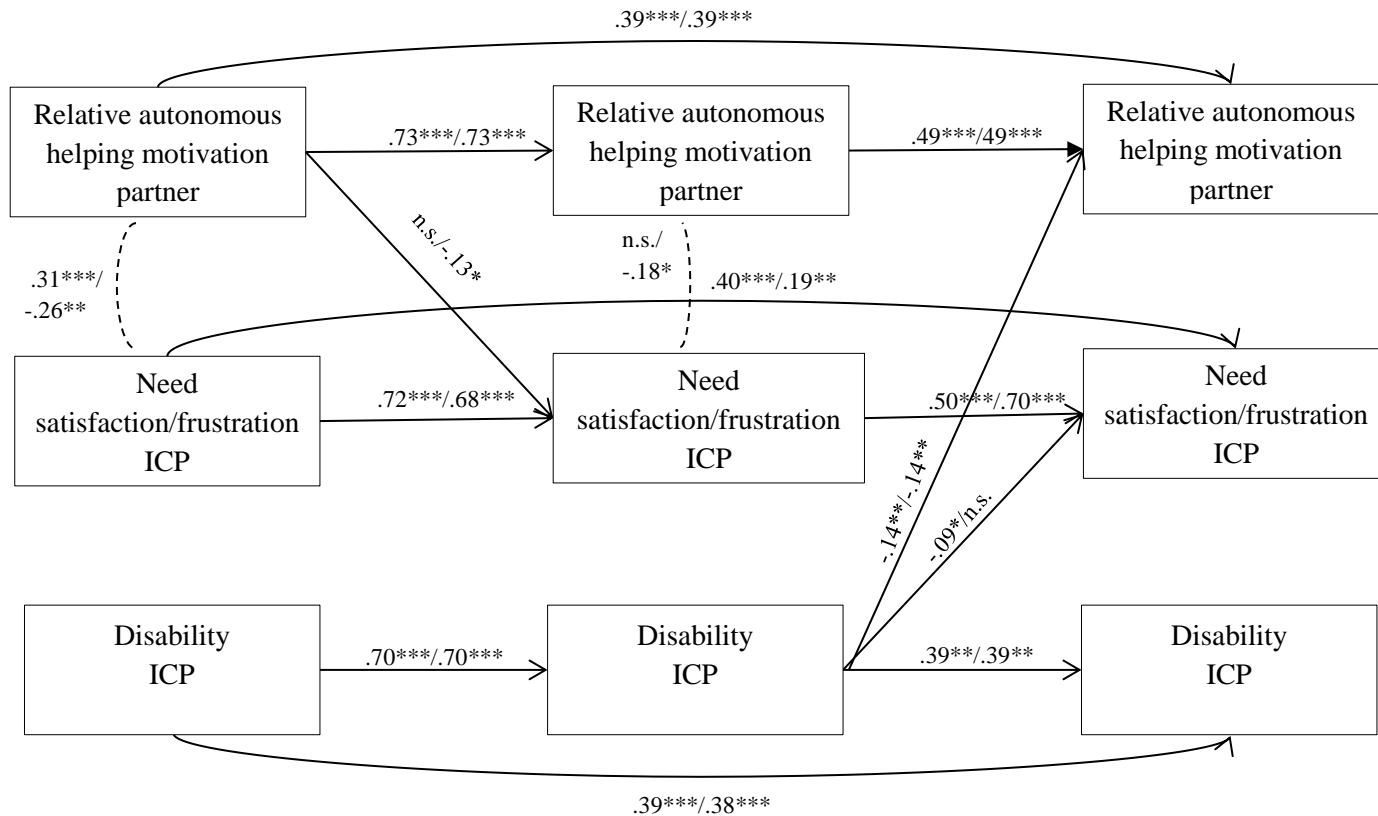
Note. Fit χ²(24)=26.39, RMSEA=.03, CFI=1.00, SRMR=.05 for model with need satisfaction (Model 3a), χ²(25)=28.42, RMSEA=.03, CFI=1.00, SRMR=.04 for model with need frustration (Model 3b). We controlled for ICP pain intensity reported at T1. Coefficients shown are standardized path coefficients. † p < .10, * p < .05. ** p < .01. *** p < .001. For the sake of parsimony, only significant associations are presented.

Figure 4. Structural equation model of partners' helping motivation and ICP need-based experience and disability.

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In the final step, we tested whether the indirect paths from partners' helping motivation to ICP wellbeing and illbeing via ICPs' relationship-based need frustration were significant (Preacher & Hayes, 2008). The results show that the indirect path from partners' autonomous helping motivation to ICP wellbeing through ICP need frustration was not significant (β = .04, p =.15) and that the indirect path from partners' autonomous helping motivation to ICP illbeing through ICP need frustration was marginally significant (β = -.03, p = .07). The indirect effects may not have reached full significance because of the conservative way in which paths were tested (i.e. controlling for initial levels of all variables in the model and for within-time associations) and also given the multi informant methodology.

DISCUSSION

In this study, we investigated whether partners' helping motivation would indirectly relate to ICP outcomes, via ICPs' need-based experiences, as defined by SDT (Ryan & Deci, 2017), including the need for autonomy (experience psychological freedom), competence (feeling effective) and relatedness (experience intimacy). Need satisfaction is distinguished from frustration as the absence of satisfaction does not by definition denote its frustration. Partners can act either supportive or thwarting towards each other's needs; a lack of need satisfaction involves being indifferent towards the partner's needs, whereas need frustration involves a more active way of undermining the partner's needs (Vansteenkiste & Ryan, 2013). Depending on the degree to which these needs get satisfied or frustrated, one can reliably predict interpersonal and intrapersonal differences in wellbeing, (mal)adjustment and even psychopathology (Knee, Porter, & Rodriguez, 2014; Patrick et al., 2007; Vansteenkiste & Ryan, 2013).

The role of ICPs' relationship-based need experiences

Results pointed in the direction of an indirect effect of partners' helping motivation on ICPs' wellbeing and illbeing, although the indirect effect did not reach significance. More specifically, partners' autonomous, relative to controlled, helping motivation was related to less relationship-based need frustration in ICPs over time, whereas the association with ICPs' need satisfaction was nonsignificant, which was rather surprising considering the significant correlations. The multi-informant nature of the data, involving separate reports of partners and ICPs and the conservative way of testing may be a possible reason for this, as are the high mean scores for need satisfaction, suggesting that there was less room for improvements in need satisfaction over time. With regard to ICP need frustration, results were in line with a diary study where the fluctuations in partners' daily helping motives were predictive for changes in ICPs' daily functioning (Kindt et al., 2016).

Zooming in on the associations between ICPs' need-based experiences and ICP outcomes, the present results partially supported the proposition that the basic psychological needs are essential nutriments for optimal functioning (Deci & Ryan, 2000). More specifically, ICPs' need satisfaction predicted a decrease in ICPs' illbeing, whereas ICPs' need frustration predicted both a decrease in ICPs' wellbeing and an increase in ICPs' illbeing. This finding is in line with the main postulates of SDT about the importance of three basic psychological needs for psychological wellbeing (Deci & Ryan, 2000) and with another study showing that ICPs' need-based experiences were predictive for ICPs' daily functioning (Kindt et al., 2016), ICPs' self-esteem, life satisfaction and psychological symptoms six months later (Uysal, Ascigil, & Turunc, 2017). Similarly, relationship-based need satisfaction in cancer survivors was related with a decline in depression three months later. Studies have also demonstrated that the fulfillment of each need within the context of a romantic relationship uniquely predicted relationship functioning (Patrick et al., 2007). The fact

that ICP need satisfaction only predicted a decrease in ICPs' illbeing, but no increase in ICPs' wellbeing, was hence rather surprising. The difference with a previous longitudinal study was that no distinction was made between need satisfaction and need frustration, but a total score using reversed need frustration items was calculated. It is important to make a distinction between need satisfaction and frustration, as both are considered different pathways to growth and vulnerability (Vansteenkiste & Ryan, 2013).

With regard to ICPs' disability over time, findings were in the reverse direction. Disability predicted a decrease in ICPs' relationship-based need satisfaction. It was not the initial level of disability, but only the shift in disability that predicted ICPs' need satisfaction over time. This is not in line with a previous diary study (Kindt et al., 2016), where partners' daily autonomous helping motives indirectly, through ICPs' relationship-based need satisfaction and frustration, related to the change in ICPs' daily disability. However, the reverse effects may not be surprising; when ICPs feel that their daily activities are restricted by pain, they may be less capable of getting their psychological needs met. When pain interferes with (for example, work, household or leisure) activities, your plans must be reconsidered (i.e. less autonomy satisfaction), you may not achieve what you wanted (i.e. less competence satisfaction) and it may impede having some social interactions (i.e. less relatedness satisfaction).

Direct associations with ICP outcomes

Although we did not expect direct associations between partners' helping motivation and ICP outcomes across time (Kindt et al., 2016), some interesting findings emerged. There was a direct effect between partners' helping motivation and ICPs' wellbeing, indicating that the initial level of partners' autonomous helping motivation could predict an increase in ICPs' wellbeing. With regard to ICPs' illbeing, no such direct effects were found in this study. This is indirectly in line with another longitudinal study (Chopik & O'Brien, 2016) showing that spousal happiness predicted better self-rated health, less physical impairment and more physical exercise above

and beyond own happiness and critical covariates. Simply having a happy partner may enhance health as much as striving to being happy oneself. Happy partners are presumably more willing and able to help, as compared with unhappy partners who are more likely to be focused on their own stressors (Chopik & O'Brien, 2016). The importance of the willingness to help your partner, is indeed shown in this study.

Results showed that disability might be a risk factor for couples because of its motivation-threatening effects, as it predicted a decrease in partners' autonomous helping motivation. This result is unlike a previous diary study (Kindt et al., 2016), where partners' daily autonomous helping motives indirectly, through ICPs' relationship-based need satisfaction and frustration, related to changes in ICPs' daily disability. Nevertheless, bidirectional relationships between our constructs could have been expected. The empathy model of pain (Goubert et al., 2005), stresses that differences in individuals suffering from pain ("bottom-up influences") may affect observers' responses. In line with this, we showed that ICPs who report more disability over time, can diminish partners' autonomous helping motivation and give the feeling that helping is a duty that needs to be done.

Theoretical and clinical implications

Romantic partners are especially impactful in a person's life. They often have the ability to pressure and persuade the other partner to adhere to medical treatment, leading to faster recovery (Stephens et al., 2009). Additional evidence is provided for the important role spousal responses play in the wellbeing of ICPs. Findings suggest that partners' underlying motives for help are important to take into account when investigating the role of spousal responses. According to a new affective-motivational model of interpersonal pain dynamics (Vervoort & Trost, 2017), the differential effects of ostensibly similar, but differentially-motivated helping behavior may be a function of the quality of the helping response, defined as behaviors that are responsive or attuned to the needs of the ICP. In this study we found evidence for the temporal associations between partners' helping

motives and ICPs' need frustration and wellbeing. Autonomously motivated partners might be less rigid and more flexible in prioritizing ICPs' need above their own needs and may be more receptive for feedback of the ICP in the caregiving process (Vervoort & Trost, 2017). An autonomous helping motivation may prevent partners from becoming overprotective (M. Hagedoorn et al., 2006; Marist Hagedoorn et al., 2000) or solicitous (Cunningham et al., 2012; Raichle, Romano, & Jensen, 2011) and thereby buffer against thwarting ICPs' need for autonomy (e.g., receiving unwanted/unnecessary help), competence (e.g., feeling incapable of taking care for oneself) and relatedness (e.g., cold interaction or feeling distance). These results reveal that it is important to provide a need-supportive environment to patients that, regardless of the disability levels, there are opportunities to feel close with others, and have a feeling of being autonomous and competent in their activities. These results identified ICP's disability as a risk factor for both diminishing partners' autonomous helping motivation and ICP's need satisfaction over time. It is important to keep doing studies about the psychosocial risk factors of disability (e.g., self-efficacy and fear avoidance beliefs (Denison, Senlöf, & Lindberg, 2004) and identify tools for their identification (Pincus, Vlaeyen, Kendall, Von Korff, Michael R.; Kalauokalani, & Reis, 2002), in order to avoid the detrimental effects on ICPs' needs and partners' helping motives.

Limitations and future research

There are some limitations that should be considered. First, although our conservatory analyses, causality can nevertheless not be discerned as third, unmeasured variables may account for the observed associations. Future research should better unpack the direction of effects by using experimental designs priming partners' helping motivation. Second, the used measures are all self-report scales, which may create a response bias through the phenomenon of social desirability. Finally, the study sample mostly includes female patients, with a long relationship duration, which limit the representability of our results. However, this study has also several strengths,

for example the low drop-out of participants and the multi-informant approach.

Future research could further explore antecedents of partners' helping motivation. One recent diary study showed that goal conflict (i.e. the interference between helping your partner and other goals) was predictive for less autonomous helping motivation from day-to-day, whereas the extent to which ICPs' expressed their gratitude was a protective factor and could predict higher autonomous helping motives (Kindt et al., 2017).

Conclusion

The current study shows that partners' autonomous, relative to controlled, helping motives have a positive effect on ICPs' wellbeing and a negative effect on ICPs' relationship-based need frustration. ICPs' relationship-based need satisfaction and frustration were predictive for changes in ICPs' wellbeing and illbeing over time. Disability in ICPs predicted decreases in partners' autonomous helping motives and ICPs' need satisfaction. Future research should further explore how partners can nurture the needs of the ICP and identify other antecedents of partners' helping motivation, which could then be used as targets for clinical interventions.

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APPENDIX

Supplementary material: Factor Analysis Helping Motivation Scale

To measure partners' helping motivation in this study, we used an adapted version of the motivation to help scale (MHS) (Weinstein & Ryan, 2010). The items were adapted for two reasons: 1) helping did not refer to helping a stranger, but helping your romantic partner and 2) we wanted a more comprehensive measure including a balanced number of items for intrinsic and identified (together autonomous) and introjected and external (together controlled) helping motives. We performed a factor analysis based upon the sample of this longitudinal study (N=141) and used three measurements of partners' helping motivation (20-item MHS). Results of these analyses are summarized in Table A. Results were in line with our expectations, only for time 1 and time 3 there were some cross-loadings present for introjected motivation items, loading higher on autonomous, instead of controlled, helping motivation. The following two items were potentially problematic: I help my partner "because only then I feel good about myself" and "because I would feel bad if I didn't help". This is not surprising considering the fact that the different types of motivation fall along a continuum ranging from nonself-determined behaviors to more self-determined behaviors (Deci & Ryan, 2000). Studies using these types of motivation often find that introjection is positively correlated with the subscale of identification. Also for introjection, regulations are within the person and have been partially internalized and are a bit more likely to be maintained over time compared with external regulations. Alpha analysis further showed that deleting some of the introjected items in the controlled motivation scale, was not beneficial for the internal consistency of the scale. In keeping with the underlying theory and original validation of the scale, we opted to include all items. This reasoning was supported by the principal component analysis and alpha analyses, which remained adequate when all items were included.

Table A. Factor loadings after principal component analysis (PCA) with promax rotation.

Subscales	Motivation items	Factor Autonomous			Factor Controlled		
		T1	T2	T3	T1	T2	T3
Intrinsic	…I like it	.66	.69	.70			
	…helping my partner brings me pleasure	.78	.72	.68			
	…helping my partner is satisfying	.84	.71	.78			
	…I enjoy it	.75	.74	.67			
	…helping and/or caring for my partner brings me joy	.80	.74	.73			
Identification	…I feel entirely committed to do so	.51	.73	.76			
	…for me personally, helping my partner is important	.50	.68	.76			
	…helping my partner is useful	.64	.53	.70			
	…I personally valued doing so	.59	.61	.72			
	…it is in line with my ideals	.64	.53	.60			
Introjection	…I owe it to myself to do this				.45	.62	.50
	…I would feel good about myself	*.56*		*.46*	.27	.45	.43
	…I would feel bad if I didn't	*.50*		*.44*	.12	.33	.30
	…I would feel guilty if I didn't	*.41*			.38	.53	.59
	…I would feel valuable as a partner	*.52*			.38	.66	.60
External	…my partner would love me				.51	.65	.60
	…my partner would criticize me				.78	.68	.69
	…my partner would appreciate me				.76	.70	.70
	…my partner demands it				.82	.70	.73
	…my partner would get mad at me if I didn't				.76	.71	.76
Eigenvalues		5.65	5.33	5.73	3.87	4.02	3.85
Explained variance		47.65%	46.75%	47.89%			

CHAPTER 6

HELPING YOUR PARTNER WITH CHRONIC PAIN: THE IMPORTANCE OF HELPING MOTIVATION, RECEIVED SOCIAL SUPPORT AND ITS TIMELINESS[1]

Objective: Like all intentional acts, support provision varies with respect to its underlying motives. Greater autonomous helping motivation for individuals with chronic pain (ICP) is associated with greater psychological need satisfaction in ICPs, which, in turn, contributes to ICPs' well-being. The present study investigates the processes explaining why partners' autonomous helping motivation yields these benefits.

Methods: 134 couples, where at least one partner had chronic pain, completed a 14-day diary. Partners reported on their daily helping motives, whereas ICPs on their daily received support, timing of help, need satisfaction/frustration and pain.

Results: When partners reported higher autonomous helping motives, ICPs indicated receiving more help, which partially accounted for the effect of helping motivation on ICP need satisfaction/frustration. Timing of help moderated the effects of daily received support on ICP need satisfaction/frustration.

Conclusions: Findings highlight the importance of receiving support on moments that it is needed most, especially when there is little support provision present.

INTRODUCTION

Chronic pain is worldwide a major public health problem (Balagué, Mannion, Pellisé, & Cedraschi, 2012; Hoy et al., 2012), which yields considerable negative consequences, such as increased anxiety and depression (Beesdo et al., 2010) and an affected social and working life (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). Also caring for others with mental or physical health problems may come with a sense of burden, distress, and burnout in family members (Leonard & Cano, 2006; Vitaliano, Zhang, & Scanlan, 2003). Although multiple intra-individual processes, such as catastrophizing and fearful thoughts about pain (Keefe, Rumble, Scipio, Giordano, & Perri, 2004; Smeets, Vlaeyen, Kester, & Knottnerus, 2006; Vlaeyen & Linton, 2000) among individuals with chronic pain (ICPs) have received substantial attention to better understand the well-being of ICPs, the critical role of interpersonal dynamics, such as partners' motives for providing help and the offer of social support, remains relatively understudied (Hadjistavropoulos et al., 2011). The key objective of the present study is to examine the processes explaining why partners' autonomous or volitional helping motivation relates to greater well-being benefits, as indexed by improved psychological need satisfaction, in ICPs, thereby considering the role of received partner support. In addition, the moderating effects of timing of support in the relationship between received support and ICP need-based experiences are explored.

The Growth-Promoting Role of Psychological Need Satisfaction

According to Self-Determination Theory (SDT; Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013), the satisfaction of the basic psychological needs for autonomy (i.e. experiencing a sense of volition), competence (i.e. feeling effective) and relatedness (i.e. feeling connected) is essential for human growth, integrity, and well-being. Depending on the degree to which these needs get satisfied or frustrated, one can reliably predict differences, both interpersonally as well intrapersonally, in well-being, (mal)adjustment

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and even psychopathology (Vansteenkiste & Ryan, 2013). It is increasingly argued in SDT that need frustration is distinct from an absence of need satisfaction. Whereas low need satisfaction would fail to foster the growth of individuals, the frustration of these needs uniquely relates to ill-being (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Stebbings, Taylor, Spray, & Ntoumanis, 2012). The difference between satisfaction and frustration is critical as unfulfilled needs may not relate as robustly to malfunctioning as frustrated needs may (Vansteenkiste & Ryan, 2013). Furthermore, each of these three needs play a necessary part in optimal development, so that none of them can be thwarted or neglected without significant negative consequences.

In the context of individuals with chronic pain, past research has demonstrated that need satisfaction comes with multiple benefits. For instance, at the cross-sectional level, higher need satisfaction in romantic partners of ICPs was related to higher partner well-being and relationship quality and lower partner distress (Kindt et al., 2015). A subsequent diary study extended this pattern of findings by showing that daily variations in need satisfaction related positively to changes in partners' daily positive affect, while being negatively related to changes in partners' daily negative affect, relational conflicts and feelings of helping exhaustion (Kindt, Vansteenkiste, Loeys, & Goubert, 2016). The opposite pattern of results was found for need frustration. Importantly, the benefits associated with daily need satisfaction were not limited to the partner, but also applied to the ICP, with daily variation in need satisfaction and frustration in ICPs being predictive for changes in ICP's affect, relational conflict, amount and satisfaction of received help and perceived disability. Furthermore, there is longitudinal evidence indicating that basic need satisfaction can predict increases in life satisfaction and self-esteem and decreases in depressive, anxiety, and somatic symptoms six months later in a sample of individuals with musculoskeletal chronic pain (Uysal, Ascigil, & Turunc, 2017). In light of the multiple benefits associated with psychological need satisfaction and

the costs associated with psychological need frustration, it is critical to identify its predictors, the partners' type of helping motivation which constitutes one such a predictor.

Autonomous Helping Motivation Serves as a Nutrient for Need Satisfaction

Within SDT, it is further maintained that experiences of need satisfaction may stem from particular types of motivated activity. Like all intentional acts, prosocial behaviors can vary with respect to their underlying motives (Deci & Ryan, 2000). Two broader types of motivation are distinguished, that is, autonomous and controlled types of motivation (Vansteenkiste, Lens, & Deci, 2006). When autonomously motivated, individuals help others because they like doing so and derive some inherent satisfaction from the act of helping itself or because they see the meaning and value of their helping behavior, either for themselves or for the recipient of help. In contrast, when controlled motivated, help is provided to avoid criticism and meet with external expectations or out of feelings of guilt and pressured loyalty towards the recipient of help. That is, controlled motivated help is phenomenologically experienced as a "should", whereas autonomously motivated help willingly emanates from the person's interests and commitments.

Available research indicates that both the help provider and the recipient of help benefit more when the help originates from autonomous or volitional instead of controlled or pressured motives. Specifically, greater autonomous motivation for helping others, either to help strangers or familiar others, predicts greater satisfaction with help (Millette & Gagné, 2008), closeness (Ryan et al., 1989), individual wellbeing (Kim, Carver, Deci, & Kasser, 2008; Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002) and relationship quality (Feeney & Collins, 2003; Patrick, Knee, Canevello, & Lonsbary, 2007) in helpers themselves. Interestingly, these effects were found to extend towards the recipient of help, as also recipients

reported improved positive affect, vitality and self-esteem (Weinstein & Ryan, 2010) when help was autonomously motivated.

More recently, motives of pain-related social support have received some attention. For instance, at the cross-sectional level, greater autonomous helping motives in romantic partners to provide help to ICPs related positively with partners' subjective wellbeing and relationship quality, while negatively relating to their distress and feelings of helping exhaustion (Kindt et al., 2015). A 14-day diary study replicated and extended this pattern of findings, thereby showing that daily variations in autonomous helping motives related to changes in daily variation in partners' individual and relational functioning (Kindt et al., 2016). Moreover, the benefits of daily autonomous helping motivation were not limited to the partners themselves, but were found to spill over to the ICP, with partners' daily autonomous helping motives related (in)directly to improvements in patients' affective (e.g., positive affect), relational (e.g., conflict) and help-specific (e.g., satisfaction with received help) outcomes (Kindt et al., 2016). Importantly, these benefits occurred because ICPs reported greater satisfaction of the need for autonomy, competence and relatedness (Deci & Ryan, 2000) on days their partners provided autonomously motivated help. That is, it was the change in ICP's daily need satisfaction and frustration which helped to explain why partners' helping motives were related with ICP's daily functioning (Kindt et al., 2016).

Why Does Autonomously Motivated Help Contribute to ICPs' Need Satisfaction?

The present study aimed to set a new step in this systematic program of research by unravelling the mechanisms why autonomously motivated help is conducive to ICPs' psychological need satisfaction. The general hypothesis is that autonomously motivated individuals may be more responsive to patients' expressed pain. Indeed, seeing someone in pain may elicit different behavioral responses in observers, which impact on the person's pain experience (Goubert, Vervoort, & Craig, 2013;

Hadjistavropoulos et al., 2011). That is, some partner responses may lead to pain relief and decreased suffering (e.g., provision of pain medication), while other responses may perpetuate the ICP's pain and distress (e.g., ignoring).

An interesting area of research focuses upon the role of social support (Mayseless, 2016). In the context of chronic pain, romantic partners are often the primary source of social support. Social support can be defined as the provision of psychological and materials resources intended to benefit an individual's ability to cope with stress. It is often differentiated in three subtypes: instrumental (e.g., providing material aid), informational (e.g., giving advice or guidance), and emotional (e.g., showing empathy, giving the opportunity for emotional expression and venting) (Cohen, 2004). Several studies provide evidence that receiving social support predicts positive health outcomes. Knoll and Schwarzer (Knoll & Schwarzer, 2002), for instance, showed that received social support in women predicted lower levels of negative affect and health complaints over time. In another sample of healthy participants, the receipt of social support was negatively related with depressive symptoms, while being positively related with physical and psychological quality of life and positive affect six months later (Schwarzer & Gutiérrez-Doña, 2005). Also in studies involving clinical samples, similar desirable effects of received social support have been observed. For example, in a cross-sectional study with Latina women with arthritis, received instrumental support related to less psychological distress, while received emotional support related to greater psychological well-being (Abraído-Lanza, 2004). Similarly, patients with multiple sclerosis showed greater reductions in depressive symptoms after following cognitive behavioral therapy when they reported higher levels of received support (Beckner, Howard, Vella, & Mohr, 2010). Also in a sample of patients with chronic stroke (Adriaansen, van Leeuwen, Visser-Meily, van den Bos, & Post, 2011), received social support related positively to patient's life satisfaction.

There is some indirect evidence for our claim that partners' level of autonomous motivation may be predictive for the amount of perceived social support by ICPs. For instance, more autonomously motivated healthy volunteers reported engaging in a greater amount of volunteering (Gagné, 2003). Also, romantic partners, who were more autonomously motivated to be and stay in the relationship, were found to more supportive towards each other, as reported by themselves as well as their partner (Hadden, Rodriguez, Knee, & Porter, 2015).

Although we propose received social support as a candidate mechanism to explain the association between partners' helping motives and ICPs need-based experiences, it is important to note that some studies have found received support to come with less desirable outcomes, such as negative affect among women with breast cancer (Lepore, Glaser, & Roberts, 2008). A recent review (Nurullah, 2012) concluded that although the majority of studies provided evidence for the health benefits associated with social support, there are indeed mixed results documented in the literature.

Whether the received support is experienced as need-satisfying and, hence, yields positive effects for ICPs' pain experiences or, alternatively, is experienced as need-frustrating thereby eliciting negative effects may in part depend on the skillfulness with which it is being provided. In this context, the timing of the provided help might be an important dimension to consider (Rafaeli & Gleason, 2009). Support can be well-meant by the help provider, but misguided due to the wrong timing of the help such that the help is not perceived to be helpful by the recipient of help. That is, ill-timed help may signal to the help recipient a lack of trust in the capacity to independently resolve the situation, thereby failing to support the ICPs' need for competence. Also, ill-timed help may elicit irritation and create some relational distance or even cause pressure (e.g., to hurry up) in the ICP as the help provider is taking over. To secure that the help is provided timely, both partners may do well to allow sufficient time or to use direct communication

to ensure that the support provider is correctly appraising the needs of the stressed partner and, hence, is better capable of attuning the provided help according to these preferences.

Present Study

An increasing number of studies document that autonomously motivated help by partners is conducive to the satisfaction of ICPs psychological needs for autonomy, competence, and relatedness, which, in turn comes with multiple benefits at the personal (e.g., well-being), and relational (e.g., relationship) level. What remains unclear is why partners' autonomous helping motivation is associated with ICP need-based experiences. Herein, we hypothesized that changes in ICPs' daily received social support, that is, partners' social support provision as perceived by ICPs themselves accounts for (i.e. mediates) the association between partners' daily autonomous helping motives and ICPs' daily satisfaction and frustration of their psychological needs (Hypothesis 1). A second aim was to explore the potential moderating effects of timing of provided help in the association between changes in daily received social support and ICPs' daily need satisfaction and frustration. Such an analysis allows us to gain more precise insight into the conditions under which support receipt is most beneficial (see Figure 1 for our theoretical model). We assume that timing of received support will moderate the effects of received support on ICPs' need satisfaction and frustration, such that ill-timed received help will come with less psychological need benefits (Hypothesis 2).
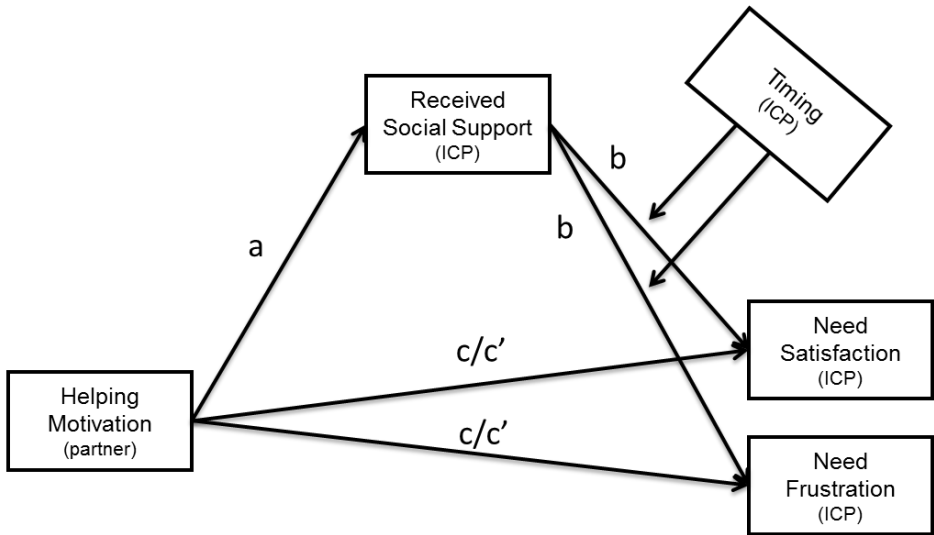
Figure 1. Theoretical model with received social support as mediator in the association between partner's helping motivation and ICP need satisfaction and frustration. Timing of help is added as moderator.

METHOD

Study design

The present study is part of a larger study, the "Helping Motivation Diary and Longitudinal Study" (HMDAL-Study), among ICPs and their partner, which comprises, apart from the diary assessment that is reported herein, three separate waves of questionnaire administration, spread across 6 months. For the purpose of the present study, ICPs and their partners completed daily diaries during 14 days, starting after the Time 1 (T1) questionnaire administration. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Study participants

Participants were couples, recruited through the Flemish Pain League (FPL), an umbrella organization for ICPs, and through the Flemish League for Fibromyalgia Patients (FLFP), which is an organization specifically for individuals with fibromyalgia. This study included 134 couples, of which 93 were members of the FPL and 41 were members of the FLFP. Recruitment details of the first 70 couples[2] that took part in the HMDAL-Study are described in another paper (Kindt et al., 2016), details of the other 64 couples[3] are described elsewhere (Kindt, Vansteenkiste, Cano, & Goubert, 2017). The present paper reports secondary analyses describing the role of social support in couples coping with chronic pain. Inclusion criteria for participation of individuals with chronic pain (ICPs) in the present study were (1) having chronic pain for at least 3 months, (2) physically living together with a partner for at least one year, and (3) being sufficiently proficient in Dutch.

The majority of ICPs were female ($N = 111$; 82.8%); the mean age of ICPs and their partner (81.3% males) was 51.73 years ($SD = 11.17$) and 53.04 years ($SD = 11.57$), respectively. All couples were heterosexual (except for two) and Caucasian. More than a third of the sample (38.1% of ICPs; 35.1% of partners) reported an education beyond the age of 18. Almost all couples were married or legally cohabiting (82.8%). The mean relationship duration was 24.64 years ($SD = 14.48$). The majority of partners were employed ($N = 90$; 67.2%), while only 21.13% of ICPs ($N = 28$) were employed. Almost all ICPs reported pain in more than one location (M = 4.02, $SD = 1.70$; range 1–7), with pain in the back (89.6%), neck (74.6%),

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[2] In this study partners' daily helping motivation, partners' and ICPs' daily need satisfaction and frustration and different partner (daily positive affect, negative affect, relational conflict and helping exhaustion) and ICP (daily positive affect, negative affect, relational conflict, satisfaction with and amount of received help and disability) outcomes, were reported.

[3] In this study partners' daily goal conflict, perceived gratitude and helping motivation and ICPs' expressed gratefulness for received help were reported.

and lower extremities (62.7%) being reported most frequently reported. Mean pain duration was 15.55 years ($SD = 12.99$). On a scale from 0 to 10, ICPs reported a mean pain intensity of 6.91 ($SD = 1.39$) and a mean disability of 6.52 ($SD = 1.96$). Fifty-two partners (i.e. 39.1%) also reported pain complaints during the past three months (which is similar to other studies with chronic pain couples, e.g., Issner, Cano, Leonard, & Williams, 2012). Paired-samples t-tests showed that pain duration ($M = 9.89$, $SD = 11.85$), pain intensity ($M = 4.31$, $SD = 1.66$) and disability ($M = 2.64$, $SD = 2.11$) were significantly lower in partners compared to the ICPs (all $ps < .05$).

Data collection procedure

Members of the FPL and FLFP received an invitation letter to participate in studies about chronic pain and quality of life in our lab (for details see Kindt et al., in revision, 2016). Participants who gave their agreement to be informed about studies were contacted by telephone to (1) provide more information about the present study and (2) assess inclusion criteria. If both partners in a couple reported having chronic pain, the individual with the longest pain duration was chosen as the ICP. The informed consents and baseline questionnaires were administered via a home visit. After completing the questionnaires, further explanation about the diary study was given. Participants were instructed to fill out the diary in the evening for 14 consecutive days. If there were no planned holidays, participants started filling in the diary the day after the home visit. Both partners received a link and a personal code for completing the diary online on a survey tool called LimeSurvey. When there was no computer or internet available, or when participants indicated to have no experience with computer/internet, they received a paper diary booklet. Twenty-four ICPs and 23 partners used the paper version of the diary. As a sign of appreciation, couples received a fee of 30 euros after completing the 2-week diary. To enhance completion rates we offered the opportunity to receive a

text message from a researcher every evening as a reminder for completing the diary.

Out of a potential 3752 end-of-day observations (268 individuals (within 134 couples) x 14 days), a total of 3595 were complete (95.82%). Records completed after 10 am the next morning were deleted, as suggested by Nezlek (Nezlek, 2012). For the paper versions of the diary we relied on the date/time indicated by the participant. Using this criterion 3575 of the 3595 completed observations were included in the analyses (i.e. 99.44% of the completed observations, or 95.28% of the total possible observations).

Diary measures

All measures described below were collected each evening during the 14 consecutive days for both ICPs and partners, unless otherwise specified. To estimate scale reliability, a multilevel confirmatory factor analysis framework was used that enables the examination of level-specific reliabilities (Geldhof, Preacher, & Zyphur, 2014). The within-level alpha reflects the ability of the scales to detect differences in systematic changes of persons over days. The between-level alpha reflects the ability of the scales to differentiate persons at the average daily level. Both within- and between-level alphas are reported.

Partner measures

Helping motivation. To measure partners' daily helping motivation, we selected 8 items from the Motivation to Help Scale (Weinstein & Ryan, 2010) that was adapted in a previous study for use with chronic pain couples (Kindt et al., 2015). Every evening, partners received a list of 8 reasons for helping or supporting their partner in pain. They reported on how true these motives were for helping their partner the past day on a 7-point scale ranging from "0" (not at all true) to "6" (totally true). Drawing from SDT, four different types of motivation were distinguished: external motivation (2 items, e.g., "because my partner demanded it from me"), introjected

motivation (2 items, e.g., "because I would feel guilty if I didn't help"), identified motivation (2 items, e.g., "because I think it is important to help my partner") and intrinsic motivation (2 items, e.g., "because I enjoy helping my partner"). Items of external and introjected motivation were summed up to represent controlled motivation to help; items of identified and intrinsic motivation were summed to represent autonomous motivation to help. In line with previous studies (e.g., Kindt et al., 2015; Weinstein & Ryan, 2010), an overall index reflecting the relative degree of autonomous helping motivation was calculated by subtracting controlled motivation from autonomous motivation scores. The daily helping motivation scores ranged from -3.75 to 6.00; the higher the score, the higher the relative degree of autonomy in providing help. The scale was reliable, within-person $\alpha = .60$ and between-person $\alpha = .75$. When partners indicated that they did not provide help during the past day, they did not receive the helping motivation items. Out of a total of 1876 days (134 partners * 14 days), only for 105 days (5.6%) scores for helping motivation were missing because partners reported they did not provide support that day.

ICP Measures

Received social support. To measure received social support, ICPs reported every evening on how their partner responded when they had pain that day. We selected four items of the Dyadic Coping Inventory (Bodenmann, 2008), slightly adapted them to a context of pain and made them suitable for a diary design. The items covered the three most widely known functions of social support: emotional, informational, and instrumental (Cohen, 2004), namely: "My partner showed empathy and understanding to me" and My partner listened to me and gave me the opportunity to talk about my pain" (i.e. emotional support), "My partner made specific suggestions, gave advice or information in order to address the problem" (i.e. informational support), and, finally, "My partner took over things that I would normally do" (i.e. instrumental support). We decided to

include two items for emotional support because responding in an empathic way and giving your partner space to talk are two different things, both capturing a facet of emotional support. All items were rated on a 7-point scale from 0 (not at all) to 6 (extremely) and the mean score of these four items was used as a measure of received social support. The scale was reliable with within-person $\alpha = .70$ and between-person $\alpha = .93$.

Timing of received social support. Timing, as an aspect of quality of help, was measured by means of 1 item: "The help/support of my partner was there at the moments I needed it." The item was rated from 0 (totally disagree) to 6 (totally agree).

Psychological needs satisfaction and frustration. To measure daily satisfaction and frustration of the three basic psychological needs (autonomy, competence, relatedness), we selected items of the Basic Psychological Need Satisfaction Need Frustration Scale (Chen et al., 2015). Two items were chosen for each basic psychological need and each time one item for need satisfaction and one for need frustration. These items were slightly adapted to a daily relational context by starting each with "Today, in the relationship with my partner …". Example items are: "…, I could freely take decisions" (i.e. autonomy satisfaction), "…, I felt pressured to do things that I wouldn't choose myself" (i.e. autonomy frustration), "…, I was confident that I could do things right" (i.e. competence satisfaction), "…, I felt like a failure by the mistakes I made" (i.e. competence frustration), "…, I felt that (s)he cared about me" (i.e. relatedness satisfaction), and "…, I felt my partner was detached" (i.e. relatedness frustration). The items assessing need satisfaction were averaged, as were the items relating to need frustration. The higher the score for need satisfaction, the more ICPs experienced satisfaction of their need for autonomy, competence and relatedness during the day. With regard to need frustration score are higher scores reflecting higher levels of frustration of the three needs. Subscales showed moderate to good reliability, with a within-person α of .66 and .56,

and a between-person α of .85 and .81 for ICPs' need satisfaction and frustration, respectively.

Pain intensity. Items for pain intensity were based on the Graded Chronic Pain Scale (Von Korff, Ormel, Keefe, & Dworkin, 1992) and adapted to a daily context. Every evening, ICPs completed an item asking "On average, how much pain did you have today?" and "How intense was your worst pain today?". Items were rated on a 7-point scale ranging from 0 (no pain) to 6 (worst imaginable pain). The two items were averaged to become a score for daily pain intensity. The scale was reliable with within-person α = .89 and between-person α = .94.

Data analytic strategy

A series of multilevel models were fitted using PROC MIXED in SAS 9.4 to examine same-day associations between partners' helping motivation and ICP need satisfaction and frustration. Data were analyzed considering two different levels; a within-couple level (level 1) and a between-couple level (level 2). Conceptually there are three levels of analysis (day, person, couple); however, only levels with random variability need to be modeled (Bolger & Laurenceau, 2013; D. a Kenny, Kashy, & Cook, 2006). In the case of distinguishable dyads (e.g., ICP vs. partner), there is no additional variability at the middle level, which means that a conceptual three-level model can be represented by a model with only two levels (Bolger & Laurenceau, 2013).

In preparation for data analysis, all daily predictors were centered within clusters (i.e. in this case person-mean centered) (Enders & Tofighi, 2007), as this is considered the most appropriate form of centering when the primary interest involves a level 1 predictor (i.e. daily helping motivation). This method removes all between-couple variation from the predictor and yields a "pure" estimate of the pooled within-couple (i.e. Level 1) regression coefficient (Enders & Tofighi, 2007). To control for between-couple variation, each partners' mean value of helping motivation was added as a

predictor at Level 2. By including this mean score, the effect of helping motivation on ICP outcomes is partitioned into two parts (West, Ryu, Kwok, & Cham, 2011): (a) the effect of daily deviations from each partner's mean level of helping motivation on different outcomes (within-couple component) and (b) the effect of each partner's mean level of helping motivation on different outcomes (between-couple component). Additionally, level 2 covariates were grand-mean-centered (i.e. age).

For each outcome, a baseline model was estimated first for the purpose of calculating the intraclass correlation coefficient (ICC). Next, predictors were added to the model. Because measures close together in time are more similar to one another than measures taken further apart in time (autocorrelation) (Bolger & Laurenceau, 2013), we used an autoregressive covariance structure in the analyses. This structure has homogeneous variances and correlations that decline exponentially with distance.

To test whether the associations between partners' helping motivation and ICP needs differs depending on reported ICP pain intensity, we performed two moderation analyses, which revealed no significant interaction effects. In our subsequent analyses we controlled for the main effect of daily pain intensity, reported by ICPs, because the need for help, and hence social support, might differ between high and low pain days. Furthermore, we conducted analyses to examine differences in the study variables in terms of ICPs' age and sex, level of education, having children, relationship quality, measured with the Dyadic Adjustment Scale (Spanier, 1976), relationship duration, ICP pain duration and presence of chronic pain in both partners. A first multivariate analysis of covariance (MANCOVA) was performed on the prediction of ICP need satisfaction and frustration. Age, relationship and pain duration and relationship quality were entered as covariates and ICP sex, education level, presence of children and of chronic pain in both partners were entered as fixed factors. Significant multivariate effects were obtained for relationship quality (Wilks's $\lambda = .62$), $F(2,118) = 36.74$, $p < .01$ and age (Wilks's $\lambda = .92$), $F(2,118) = 5.125$, $p < .01$. Second,

two analyses of variance (ANOVA) were performed in which the same predictors were entered on, first, the prediction of partners' relative autonomous helping motivation and, second, the prediction of ICPs' received social support. For both helping motivation and received social support, two significant univariate effects were obtained for relationship quality ($F(1,120) = 6.87$, $p<.05$ and $F(1,120) = 100.50$, $p<.01$, respectively) and relationship duration ($F(1,120)=13.91$, $p<.01$; and $F(1,120) = 6.09$, $p<.05$, respectively). Hence, relationship duration, relationship quality and age were added to the analyses as level 2 predictors which to control for.

To examine whether partners' daily helping motivation related to a change in need satisfaction and frustration in ICPs, we controlled for prior day levels of the outcome. The variables that are part of the proposed mediation analysis were all at the within-couples or the lower level (i.e. level 1), so the mediation analyses we conducted can be referred to as 1 $\rightarrow$ 1 $\rightarrow$ 1 mediation or lower level mediation (Bauer, Preacher, & Gil, 2006; D. A. Kenny, Korchmaros, & Bolger, 2003). Multilevel mediation allows for the possibility that each of the effects may vary across couples (i.e. heterogeneous effects). In the absence of upper-level variation in the effect of the exposure on the mediator (the a-path) and of the mediator on the outcome (the b-path), the mediated effect in the 1-1-1 setting is reduced to $a*b$. In line with other diary studies (Badr, Laurenceau, Schart, Basen-Engquist, & Turk, 2010), we found no evidence against such homogeneous effects (i.e. the corresponding random effect variances were very small).

RESULTS

Descriptive statistics and Preliminary Analyses

Table 1 provides within-couple (based on person-centered diary scores across days) and between-couple correlations (based on aggregated

Table 1. Means, Standard Deviations, ICC values, and Pearson Correlations among Study Variables

	1	2	3	4	5	6	*M*	*SD*	ICC
1. Relative autonomous helping motivation[P]	-	.21*	.29**	.43**	-.33**	.06	2.27	1.48	70.41
2. Received social support[ICP]	.15†	-	.74**	.48**	-.38**	.22*	3.09	1.18	63.03
3. Timing[ICP]	.10***	.42†	-	.69**	-.48**	.01	4.09	1.21	58.38
4. Need satisfaction[ICP]	.10†	.22†	.26†	-	-.71**	-.13	4.30	1.03	48.05
5. Need frustration[ICP]	-.09***	-.12†	-.17†	-.37†	-	.14	1.01	.88	57.11
6. Pain[ICP]	.01	.12†	-.07**	-.22†	.21†	-	3.50	.99	46.12

Note. ICP = only measured in ICPs, P = only measured in partners, M=mean, SD=standard deviation, ICC=intraclass correlation coefficient. Correlations above diagonal represent between-couple correlations. Correlations below diagonal represent within-couple, across-day correlations. The potential number of observations can reach up to 1876 (134 couples across 14 days).

*$p<.05$
**$p<.01$
***$p<.001$
$^{\dagger}p<.0001$

diary scores), between the variables of interest. Correlational analyses demonstrated, both on the within- and the between-level, significant positive correlations between partners' relative autonomous helping motivation and received social support, timing of received help, ICP need satisfaction and a negative correlation with ICP need frustration. Received social support also showed significant positive correlations with timing, ICP need satisfaction, while being negative correlated with ICP need frustration. Timing was also correlated with ICP need satisfaction and frustration. ICP pain intensity was only negatively correlated with timing and need satisfaction and positively correlated with need frustration at the within-couple level. A positive correlation between pain and received social support was present at both levels.

The ICC represents the percentage of the total variance of a variable that is due to between-couple mean differences (Bolger & Laurenceau, 2013). The amount of within-couple variation can be calculated by subtracting the ICC from 1. Within-couple differences accounted for 29.59% (1-70.41) and between-couple differences accounted for 70.41% (i.e. ICC value) of the variance in partners' helping motivation (see Table 1).

Received social support as mediator

We tested whether the associations between partners' daily autonomous helping motivation and ICP need satisfaction and frustration were mediated by ICPs' daily received social support. First, we examined whether partners' daily helping motivation related to ICP daily need satisfaction and frustration (c-paths; see Figure 1), while controlling for the previous day level of need satisfaction and frustration, respectively. As a result of controlling for the corresponding outcome the day before, the observed findings address the question whether the type of helping motivation relates to a change in a particular outcome on a given day, when compared to the previous day. Second, for the a-path (see also Figure 1) we tested whether partners' helping motivation was related to ICPs' received

social support, controlling for received social support the previous day. Third, we tested in two separate models whether daily changes in received social support (b-paths) were related to ICP need satisfaction and need frustration, respectively (see also Figure 1). In these models, we controlled for the outcome (i.e. need satisfaction or frustration) the previous day and partners' daily helping motivation. Finally, to investigate the indirect effect ($a*b$) of helping motivation on changes in ICP need satisfaction and frustration through changes in received social support, we performed a Sobel test (Baron & Kenny, 1986). In all models, we controlled for ICP pain intensity on the within-couple level and for relationship duration, relationship quality and ICP age on the between-couple level. Results of all mediation analyses are displayed in Table 2.

Table 2. Multilevel Regression Analysis with Received Daily Social Support as a Mediator in the Relation between Partners' Daily Helping Motivation and ICPs' Daily Need-based Experiences

Effect	Need Satisfaction			Need Frustration		
	B	SE	95% CI	B	SE	95% CI
c	.10***	.02	[.05; .15]	-.08**	.02	[-.12; -.03]
a	.12***	.02	[.08; .17]	.12***	.02	[.08; .17]
b	.20***	.03	[.15; .25]	-.13***	.03	[-.18; -.07]
c'	.07**	.02	[.03; .12]	-.06*	.02	[.-.11; -.01]
a*b	.02***	.01	[.01; .04]	-.02***	.00	[-.03; -.01]

Note. The c-path is the relation between helping motivation and ICP outcomes (while controlling for the outcome the previous day). The a-path represents the association between helping motivation and received social support (while controlling for received social support the previous day); the b-path represents the association between received social support and ICP outcomes (while controlling for the outcome the previous day and helping motivation – the c'-path); and the c´-path refers to the association between helping motivation and the different ICP outcomes when the b-path is taken into account. In every model we controlled for ICP pain intensity on within-couple level and for relationship duration, relationship quality and ICP age on the between-couple level. *p<.05, **p<.01, ***p<.001.

Results showed that partners' daily helping motivation was significantly related to changes in ICPs' day-to-day need satisfaction and frustration (c-paths). Partners' daily helping motivation was further significantly and positively related to changes in ICPs' day-to-day received support (a-path). Changes in ICPs' received social support were significantly related to changes in ICPs' daily need satisfaction and need frustration (b-paths), when controlling for partners' daily helping motivation. Furthermore, the initial associations between partners' helping motivation and ICP's needs satisfaction/frustration remained significant after ICPs' received social support was included in the model (c'-path). Results showed that all indirect effects were significant, indicating that a partial mediation was present for both outcomes. Specifically, partners' helping motivation contributed to changes in ICPs' daily need satisfaction and frustration, partially through increases respectively decreases in ICPs' received social support.

The moderating role of timing

Timing of help was examined as a potential moderator in our mediation model depicted in Figure 1. The results for our c'- and a-path remained significant after adding the main effect of timing and the interaction effect of timing and received social support. Results further showed a main effect of timing on ICP need satisfaction (B=.23, SE=.06, p<.001; B=.21, SE=.04, p<.001) and ICP need frustration (B=-.29, SE=.06, p<.001; B=-.21, SE=.04, p<.001), respectively. For each outcome variable, there was a significant interaction effect between received social support and timing (B=-.03, SE=.01, p<.01; B=.05, SE=.01, p<.001), which is graphically depicted in Figures 2 and 3. To examine these interaction effects we calculated received social support scores one and two standard deviation(s) above and below the mean. As can be noticed in Figure 2, the association between received social support and ICP need satisfaction was stronger for low scores on timing of received social support, that is, when the help was - relatively speaking - more ill-timed. In contrast, when the provided help was

well-timed, the slope is less steep suggesting that timing plays a less critical role when ICPs receive higher levels of social support. A similar pattern was found for need frustration (see Figure 3), with the association between received social support and ICP need frustration being stronger for low, compared to high, scores on timing of received social support. Said differently, although received social support does relate negatively to need frustration among ICPs, its critical role is even more pronounced when the help is ill-timed.

Table 3. Multilevel regression analysis: Timing as a Moderator in the Association between Received Daily (top half) and Across-day (bottom half) Social Support and ICP Need-based Experiences

	ICP outcomes					
Daily predictor	Need Satisfaction			Need Frustration		
	B	SE	95% CI	B	SE	95% CI
Level 1 (within-couple)						
Helping motivation	.06*	.02	[.01; .10]	-.06*	.02	[-.11; -.01]
Outcome previous day	-.02	.03	[-.07; .03]	-.13***	.03	[-.18; -.08]
Pain	-.23***	.03	[-.28; -.17]	.20***	.03	[.14; .25]
RSS	.23***	.06	[.11; .35]	-.29***	.06	[-.40; -.16]
Timing	.21***	.04	[.13; .28]	-.21***	.04	[-.29; -.14]
RSS*timing	-.03**	.01	[-.05; -.01]	.05***	.01	[.03; .08]
Level 2 (between-couple)						
M helping motivation	.11**	.04	[.03; .20]	-.08Ɪ	.05	[-.17; .01]
M pain	-.18*	.07	[-.32; -.03]	.14Ɪ	.08	[-.01; .29]
M RSS	-.08	.19	[-.44; .29]	.23	.20	[-.15; .62]
M timing	.51***	.13	[.26; .74]	-.11	.13	[-.37; .15]
M RSS*timing	-.00	.04	[-.08; .08]	-.02	.04	[-.10; .05]
Relationship quality	.01*	.00	[.00; .02]	-.02***	.00	[-.03; -.01]
Relationship duration	-.00	.01	[-.02; .01]	-.00	.01	[-.02; .01]
age	-.01	.01	[-.02; .02]	.00	.01	[-.01; .02]
-2 Res Log Like	3179.1			3311.1		

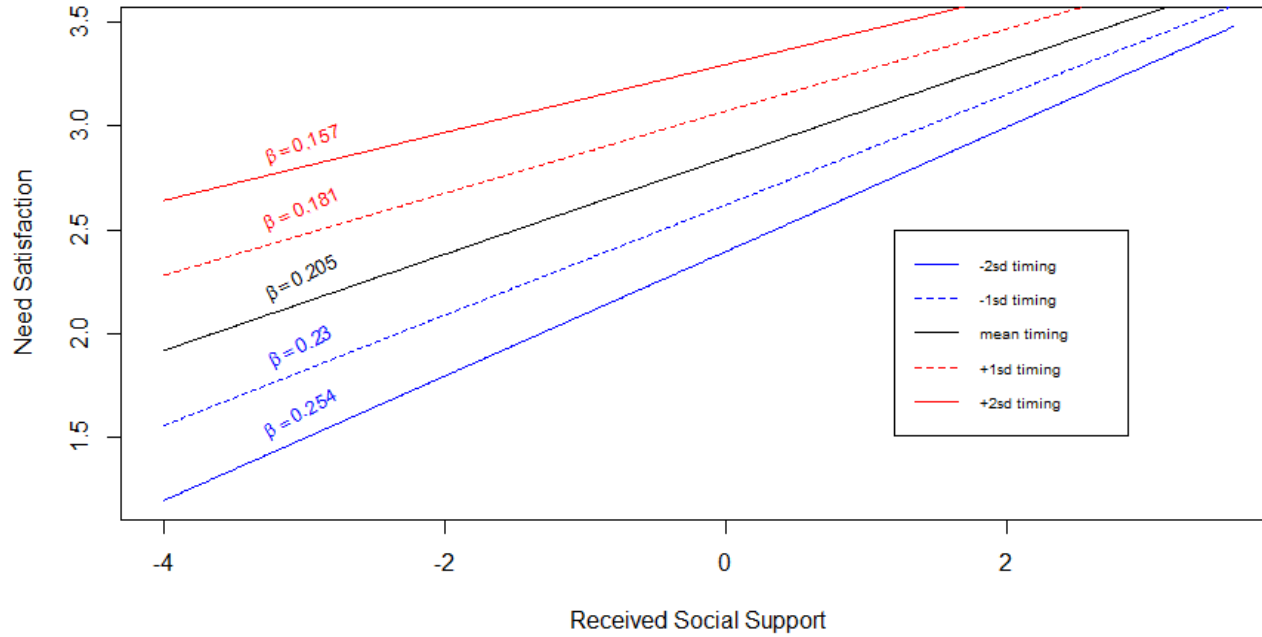*Note.* M=mean; RSS=received social support; Ɨp<.10, *p<.05, **p<.01, ***p<.001.

Figure 2. Interaction effect between received social support (RSS) and timing for daily ICP need satisfaction.
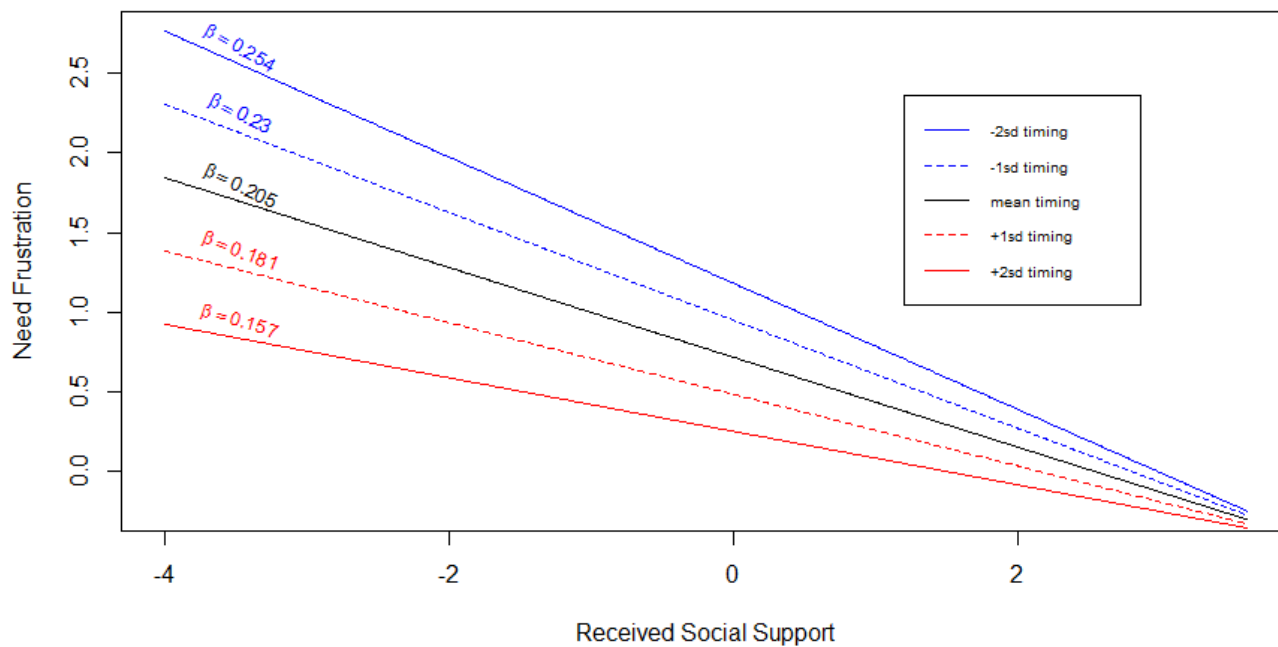
Figure 3. Interaction effect between received social support (RSS) and timing for daily ICP need frustration.

DISCUSSION

The present study was the first to examine whether autonomous helping motivation promotes day-to-day received support in individuals with chronic pain (ICPs) and whether received support might function as an explanatory process in the association between partners' autonomous helping motivation and ICP need satisfaction and frustration. A second aim of this study was to investigate whether the timing of received social support helps to understand when received support contributes to ICPs' need-based experiences (Rafaeli & Gleason, 2009).

With respect to our first hypothesis, received social support partially explained the psychological need benefits of partners' daily autonomous helping motivation. This finding was consistent with our expectations, and is in line with other studies showing that greater autonomy in helping relates with higher levels of support provision (Bidee et al., 2013; Gagné, 2003; Hadden et al., 2015; Weinstein & Ryan, 2010). Our study is, to our knowledge, the first to show that experiencing autonomy in providing support is related with the level of received support as perceived by the recipient of help (i.e. the ICP). On days that caregivers are more autonomously motivated, they are probably more likely to take the frame of reference of the ICP, thereby patiently attuning their support according to the ICP's needs. Due to such attunement, ICPs may be allowed a greater sense of initiative in resolving issues themselves, such that also a stronger and more authentic bond may develop between the partner and the ICP, while the ICP may at the same time feel more effective in their daily functioning. This might be a reason why ICPs experience the actions and behaviors of their partner as more supportive. The current results are also in line with previous studies that reported positive effects of social support (Abraído-Lanza, 2004; Schwarzer & Gutiérrez-Doña, 2005). In a context of chronic pain, spousal support has been associated with a host of pain-related outcome variables,

including patient's coping with and adjustment to pain as well as their experienced psychological distress (Flor, Breitenstein, Birbaumer, & Fürst, 1995; Romano, Jensen, Turner, Good, & Hops, 2000; Romano, Turner, & Jensen, 1997; Turk, Kerns, & Rosenberg, 1992). The present study advances the field by demonstrating that the amount of received daily spousal support carries benefits for ICPs' daily variations in psychological need satisfaction and frustration. Social support helps – at least partially – to account for the fact that autonomous helping motivation relates to ICPs' need-based experiences such that the relation between autonomous helping motives and the fulfillment of ICPs psychological needs is not only a direct but also an indirect one. Specifically, on days where partners display more autonomous helping motives, ICPs perceive higher levels of partner support and experience changes in the satisfaction and frustration of their basic psychological needs.

Because received social support could not fully explain the relationship between partners' helping motivation and ICPs' need-based experiences, the role of partners' daily autonomous helping motivation remains important regardless of the type of support that is being provided or received. Alternatively, it could also be the case that a multi-item measure of support, thereby differentiating between the three subtypes (i.e. instrumental, emotional and informational) and including three instead of a single mediator, may help to explain the remaining direct contribution of autonomous helping motivation. However, based on our data we cannot disentangle whether the different types of received social support play a distinct role herein. Future studies could measure these different support functions more extensively. Another possibility is that other underlying processes, not captured in the present study, are operative.

Because some previous studies have showed that the correlates of social support are not invariantly positive (Nurullah, 2012), the final aim of our study was to explore whether the role of received social support on ICP need satisfaction and frustration differed depending on its timing. Our results

indeed showed that the effect of received social support gradually differed according to whether help was rather well-timed or ill-timed. More specifically, the timing of support showed to be particularly important in situations where ICPs perceive little support, presumably because it then compensates for the fewer need benefits derived from receiving little help. With regard to need frustration, the opposite effects were found. When ICPs reported receiving little support, they reported less need frustration in case the timing was perceived to be adequate, suggesting that timing buffers against the costs associated with low support. The differences in daily need frustration between ICPs who receive much help and those who receive little help become almost negligible if the timing of help is good. A similar reasoning can be used to interpret the interaction effects with regard to high levels of received social support. When ICPs experience a lot of support, timing does not really matter because need satisfaction is already quite high in that situation. That is, when little support was present, clearer differences in need-based experiences as a function of timing were observed. On days with little support in combination with poor timing of that support, ICPs experienced low need satisfaction and high need frustration. This finding is also line with other models in the social support literature, for example the optimal matching model of social support (Cutrona, 1990) and the concept of perceived partner responsiveness (Reis, Clark, & Holmes, 2004), where support is considered most beneficial when it matches with the support needs of the receiver.

The findings of the current study might have clinical implications. Partners are often pressured to divide their time and energy across different sets of activities and goals (Riediger & Freund, 2004). Providing support to your partner in pain is only one goal within a hierarchy of other goals a partner may have, for example investing time in work, education or family. This may cause partners to experience their helping task as a daunting duty, which may elicit more controlled motives for helping (Kindt et al., 2017) and consequently lower levels of ICP received support. In situations where

partners feel pressured to provide help, it is important that the support is present on those moments that it is most needed. For this, it seems crucial that partners are aware of the stressors ICPs experience and the consequent support needs that may arise from it. Also ICPs may benefit from learning to communicate their support needs towards their partner, which may be an important target point for clinical practice.

Limitations and future directions

This study has several limitations, which have implications for future research in this area. First, although we controlled for previous day levels of our outcome measures, we cannot address causality. A bidirectional relationship may be present between partners' helping motivation and received social support. In the study of Weinstein & Ryan (2010), it was shown that experimentally induced autonomous helping motivation resulted in higher levels of help; however, received help was not measured in this study. The same may be true for the association between received social support and need satisfaction/frustration; individuals low on need satisfaction in general may have a cognitive bias and may not interpret their partners' helping behavior as support provision. Future studies may address this by manipulating the amount of help provided in the lab and examine its effects upon ICPs' subsequent need satisfaction and frustration. Furthermore, our data only include partner and ICP self-reports of daily behavior. To overcome this limitation, future studies may use observational methods, which would enable us to actually code partners' helping behaviors. Finally, all included couples were Caucasian, in a stable relationship, with high levels of average marital satisfaction, which limits generalizability of the findings.

Important to note, however, is that the associations between partners' helping motivation and ICP received support were present even though we had multiple informant data. Partners reported on their own helping motivation, whereas ICPs reported on their own perceptions of

received partner support. Furthermore, using diary methodology has several advantages. By collecting daily information, individuals' experiences are captured in their natural context and closely to their occurrence (Bolger, Davis, & Rafaeli, 2003), which is beneficial for the ecological validity. It provides the opportunity to investigate the extent to which variables vary from day-to-day in addition to the extent to which they vary across persons. Substantial day-to-day variation in partner's helping motives, received social support and timing of help was observed. Furthermore, by using diary methodology, we were able to investigate whether changes in motivation related to changes in ICP received support and need satisfaction and frustration by always including previous day levels of our variables.

In sum, the present study provides new insights into the underlying mechanism through which partners' helping motivation relates to the daily variation in ICP outcomes. Our findings showed that ICPs reported receiving more support from their partner when their partners reported helping their partner because they truly wanted to or valued it, instead of feeling pressured to do so. When ICPs perceived such support to be present, they benefitted in terms of improved satisfaction and reduced frustration of their psychological needs for autonomy, competence and relatedness. Furthermore, when partners are not capable to provide great amounts of help, they would do well to provide the low dose of help on the right moment; indeed, well-timed help appeared to buffer against the costs associated with low social support.

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CHAPTER 7

WHEN IS YOUR PARTNER WILLING TO HELP YOU? THE ROLE OF DAILY GOAL CONFLICT AND PERCEIVED GRATITUDE[1]

Motivation to provide help might vary from day-to-day. Previous research showed that autonomously motivated help (i.e. helping because you enjoy/value this behavior), compared with controlled motivated help (i.e. helping because you feel you should do so), has beneficial effects for both the help provider and recipient. In a sample of chronic pain patients and partners (N = 64 dyads), this diary study examined whether (1) same- and prior day perceived gratitude (i.e. received appreciation for providing support) in partners and (2) same- and prior day goal conflicts in partners (i.e. amount of interference between helping one's partner in pain and other goals) predicted partners' helping motivation. Partners provided more autonomously motivated help on days that they perceived more gratitude from their partner and when they experienced less goal conflicts. Lagged analyses indicated that perceived gratitude (but not goal conflict) even predicted an increase in autonomous helping motivation the next day. Implications are discussed in the context of Self-Determination Theory.

INTRODUCTION

Like all intentional acts, prosocial behaviors can vary with respect to its underlying motives (Deci & Ryan 2000). One can, for instance, help others because one likes doing so or sees the meaning and value of it (i.e. autonomous motivation) or because one experiences a sense of guilt or conflicted loyalty if one would not do so (i.e. controlled motivation). Available research indicates that both the help provider and the recipient of help benefit more when the help is autonomously offered rather than stemming from controlled motives. Specifically, greater autonomy in helping others is associated with increased closeness and well-being (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006; Knee, Patrick, Vietor, Nanayakkara, & Neighbors, 2002; Patrick, Knee, Canevello, & Lonsbary, 2007; Weinstein & Ryan, 2010), not only in helpers themselves, but also in recipients of help, a finding documented in both healthy (Gagné 2003; Weinstein & Ryan 2010) and clinical samples (Kindt et al., 2015; Kindt, Vansteenkiste, Loeys, & Goubert, 2016).

Given the critical role of autonomous helping motivation, it is important to investigate factors that promote this type of motivation and prevent helpers from developing controlled motives in the helping process. The current study aimed at examining possible predictors of helping motivation in partners of individuals with chronic pain (ICP). Specifically, we investigated (1) the contribution of perceived daily gratitude in partners in predicting their helping motivation and (2) the role of daily experienced conflict by partners between helping their partner in pain and other personal held goals (e.g., work-related goals) in explaining their daily helping motivation. We additionally explored the extent to which daily gratitude, as expressed by ICPs, relates to daily perceived gratitude in partners.

Investigating helping interactions in chronic pain couples is especially relevant because of ICPs' frequent and repeated needs for help. As helping other individuals is by definition a social and dyadic process, the motivation to help may be influenced by factors in both the help provider

(i.e. goal conflict) and the help recipient (i.e. gratitude). These two predictors form a balanced pair, both in terms of the primary target (i.e. partner him/herself or ICP) and its valence (i.e. the one factor may be considered a protective/motivation-promoting factor and the other a risk/motivation-threatening factor). Specifically, while goal conflict concerns the partner's personal experience and represents a risk factor, gratitude is more reflective of the interpersonal dynamics between ICPs and partners and constitutes a growth-promoting factor. Second, given our central focus on explaining day-to-day variations in helping motivation, we selected predictors which may have sufficient day-to-day variation as suggested by past work (Casier et al. 2013; Gordon et al. 2011).

Not All Help is Created Equal: A Consideration of its Motivational Basis

Self-determination theory (SDT) is a broad theory of human motivation, which maintains that individuals' sustainable motivation, development, and integrative functioning are facilitated when their basic psychological needs for autonomy, competence, and relatedness are nurtured (Deci & Ryan 2000). SDT employs a differentiated view on motivation, distinguishing between more optimal (i.e. autonomous) and less optimal (i.e. controlled) forms of motivation (Vansteenkiste, Lens, & Deci, 2006). When applied to helping behavior, *autonomous helping motivation* refers to helping out of enjoyment and inherent satisfaction the helping provides or because helping is perceived as personally valuable and meaningful. In contrast, *controlled helping motivation* involves pressure to help, which can either reside in external forces, such as the avoidance of the recipients' criticism or the garnering of external approval, or in internal forces, such as a sense of pressured loyalty or guilt. Abundant research has found autonomous, relative to controlled, motivation to yield manifold benefits, including behavioral persistence, enhanced well-being, and better relational functioning (Vansteenkiste, Niemiec, & Soenens, 2010).

Also in the domain of prosocial behavior it is critical to take into account the motives underlying helping behavior to better understand when and why provided help yields benefits. Presumably, not all provided help is experienced as gratifying and helpful, neither by the help provider nor by the recipient. In an initial study among elementary school children it was shown that more autonomous motives for prosocial behavior related to greater empathy and relatedness with parents and teachers (Ryan et al., 1989). Subsequent work among adults showed that more autonomous motives for volunteering related to greater satisfaction (Millette & Gagné 2008) and work effort (Bidee et al., 2013). Interestingly, the well-being benefits of autonomous motives for prosocial behavior, in samples of university students, radiated towards the recipients of help, who also experienced greater relatedness need satisfaction and rated the received help to be of higher quality (Weinstein & Ryan 2010).

Similar findings have recently been documented among ICPs with chronic pain. Kindt et al. (2015) showed that the reasons why partners provided help to their partner in pain related positively to their self-rated well-being and relationship quality. Interestingly, autonomous helping motivation in partners was also associated with a better relational functioning of ICPs, but only for those with high levels of pain. These findings were replicated in a diary study where daily autonomous helping motives in partners related to improvements in partners' and ICPs' affective (e.g., positive affect), relational (e.g., conflict) and help-specific (e.g., exhaustion, satisfaction with help) outcomes (Kindt et al., 2016). These studies provided new insights into the question when partners of ICPs may be distressed or relationally dissatisfied. However, there is a need for further studies to examine factors that may potentially promote autonomous helping motives as well as those factors that increase partners' risk from becoming controlled motivated in the helping process. Two factors that might have an impact upon daily helping motives in partners will be discussed, that is, perceived gratitude and daily goal conflicts.

Gratitude and Helping Motivation

While some recipients of help are grateful for the received help, others may instead perceive the received help as expected and normal such that they fail to express their gratitude. Such expressed gratitude may nevertheless have a motivating impact on help providers, leading them to become more strongly committed and more willing to provide help, an issue we sought to examine in the present study.

Gratitude has been defined as "the recognition and appreciation of an altruistic gift" (Emmons & McCullough 2004, p.9). It is the positive emotion felt when another person has intentionally given (or attempted to give) something of value (McCullough, Kilpatrick, Emmons, & Larson, 2001). Previous research typically examined whether expressed gratitude yields benefits for the person being grateful. Feelings of gratitude were found to improve mood, coping behaviors, and physical health symptoms (Emmons & McCullough, 2003), to increase individuals' life satisfaction (Lambert, Fincham, Stillman, & Dean, 2009) and sense of coherence (Lambert, Graham, Fincham, & Stillman, 2009) as well as to reduce depressive symptoms over time (Wood, Maltby, Gillett, Linley, & Joseph, 2008). Experimental studies, involving a gratitude induction, showed that participants who were made to feel grateful toward a benefactor were more likely to provide help themselves (Bartlett & DeSteno 2006; Tsang 2006).

Although the benefits of gratitude for the person expressing it are well-documented, few studies have examined whether expressed gratitude impacts on the benefactor (Algoe, Kurtz, & Hilaire, 2016). In the case of a helping relation, the question is whether the gratitude as displayed by the recipient of help affects the help provider. A few older experiments indicated that gratitude expressions can increase both the initiation (McGovern, Ditzian, & Taylor, 1975; Rind & Bordia, 1995) and maintenance (Clark, Northrop, & Barkshire, 1988) of prosocial behavior of others even when it has a certain cost (e.g., receiving an electrical shock). In a more recent experimental study, gratitude expressions motivated healthy participants to

provide help a second time and made them persist longer in their helping activities without being asked (Grant & Gino, 2010). In an observational study benefactors rated how understood, validated, and cared for they felt during an interaction with a grateful person. After this laboratory-based conversation, the benefactor rated the grateful person as being more responsive and also reported higher positive emotions (Algoe et al., 2016).

Taken together, research suggests that saying "thank you" to your helper might be a powerful tool for receiving support in the future. Indeed, the reason why we consider gratitude as a good candidate for predicting someone else's helping motivation is because of its unique characteristics, compared with other positive emotions, in promoting healthy relationships (Algoe & Stanton 2012). For instance, when romantic partners receive gratitude from their partner, they feel closer and more satisfied with their relationship (Algoe, Gable, & Maisel, 2010), they indicate to be more responsive to their partners' needs, and to be more committed to remain in their relationship (Gordon et al. 2012), thereby engaging in more relationship maintenance behaviors (e.g., trying to resolve conflicts; Kubacka et al. 2011), while feeling less inhibited to voice relationship concerns (Lambert & Fincham, 2011).

Clearly understudied, however, is the extent to which expressed gratitude is effectively received by the person for whom it is intended. Are partners of ICPs able to "read" the gratefulness of their partner? To our knowledge no other studies included this research question. In this study it is explored whether *expressed* gratitude by ICPs is related to *perceived* gratitude in partners. Another important question that remains to be examined, is how perceived gratitude impacts helpers' motivation to provide help. Here, it is expected that higher perceived (and expressed) gratitude would relate to stronger autonomous helping motives. This study is particularly valuable as it consists of measures assessed in a daily context, which are more ecologically valid than those obtained as part of some experimental paradigms.

Goal Conflict and Helping Motivation

Apart from (perceived or expressed) gratitude, individual differences in helpers' own functioning may relate to their daily helping motivation. Herein, we argue that one viable candidate is the help provider's daily experienced goal conflict. Typically, individuals, including partners of ICPs, strive to attain multiple goals within a given day. While some of these goals may be highly compatible and even strengthen each other, other goals may interfere with each other. Goal conflict occurs "when the pursuit of one goal impairs the likelihood of success in reaching another goal" (Riediger and Freund 2004, p.1511), often due to the lack of sufficient resources, such as time, energy, or money. For example, if one has the goal to become successful at work, the pursuit of this goal may require spending long hours at the office and working on weekends. However, if one's partner has chronic pain and is in need of help, this work-related goal might interfere with the goal of being available for one's partner with pain and providing practical or emotional support.

To our knowledge, studies that linked relational functioning with pursuing different goals are scarce. A study of romantic partners showed that both partners' reports of higher goal conflicts were associated with lower relationship quality and lower subjective well-being (Gere & Schimmack, 2013). Studies have further shown that, as can be expected, greater goal conflict impedes successful goal attainment (Boudreaux & Ozer, 2012). Further, a diary study among adults (Riediger & Freund, 2004) indicated that goal interference, in terms of time, energy or financial constraints, predicted relative decline in positive affect as well as relative increase in negative affect. In line with such findings, Righetti et al. (2016) showed that encountering situations of goal conflict with one's partner resulted in higher levels of daily negative affect and stress and also impacted daily relationship satisfaction.

Overall then, goal conflict comes with a personal cost, yet, the relation with partners' helping motivation has, to the best of our knowledge,

not been investigated yet. From the perspective of SDT (Deci & Ryan, 2000), goal conflict may create pressure as one feels conflicted to divide one's limited time and energy across different goals. If helping one's partner needs to be combined with the pursuit of other life goals, providing help might directly hinder partners from doing something else, thereby eliciting the experience that helping is a daunting duty. We further argue that people who perceive helping as interfering with other activities have not entirely integrated this behavior within their other life values and goals. In line with SDT, we therefore propose that goal conflicts create pressure and come with more controlling motives (e.g., "I have to help" instead of "I want to help") to provide support to one's partner.

Present Study

The current study is the first to examine two potential antecedents of someone's helping motivation. It is hypothesized that perceived gratitude and goal conflict are two possible candidates to investigate. By letting couples complete diaries, data are more ecologically valid than when, for example, feelings of gratitude are elicited through an experimental paradigm. Another interesting feature of diary data is that they allow differentiating between within- and between-person variation in gratitude and goal conflict. As a first research question, it is hypothesized that ICPs' day-to-day variation in expressed gratitude (i.e. expressed appreciation for receiving partner support) will relate to the day-to-day fluctuations in partners' perceived gratitude. It remains important to examine whether expressed gratitude in one person is associated with perceived gratitude in another person. No other studies investigated expressed and perceived gratitude simultaneously in a daily context. Second, it is expected that perceived gratitude by partners on a given day will predict partners' helping motivation the same day. Third, it is hypothesized that, beyond the effect of perceived gratitude, day-to-day fluctuations in partners' experienced conflict between goals related to helping their partner in pain and other personal goals will be

associated with partners' daily helping motivation during the same day. The beneficial role of perceived gratitude and the hampering role of goal conflict for partners' motivation may not only be observed on the same day, but also radiate to the next day. Therefore, in a series of lagged analyses, we sought to examine whether both predictors, as assessed on a given day, would relate to a change in helping motivation the next day.

METHODS

Study design

The present study is part of a larger study, the "Helping Motivation Diary and Longitudinal Study" (HMDAL-Study), among individuals with chronic pain (ICPs) and their partner, which comprises, apart from the diary assessment that is reported herein, three separate waves of questionnaire administration, spread across 6 months. For the purpose of the present study, ICPs and their partners completed daily diaries during 14 days, starting after the Time 1 questionnaire administration. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Study participants

Participants were couples ($N = 64$), recruited through the Flemish Pain League (FPL; $N = 23$), an umbrella organization for ICPs, and through the Flemish League for Fibromyalgia Patients (FLFP; $N = 41$), which is an organization specifically for individuals with fibromyalgia (see Figure 1). Details about the recruitment of patients through the Flemish Pain League are described in the paper of Kindt et al., 2016. With regard to the recruitment of participants through the FLFP, 1391 members received an invitation letter in February 2015 to participate in studies about chronic pain and quality of life in our lab. About 35% ($N = 485$) agreed to be contacted by phone. Three hundred seventy-seven of them indicated that they were

currently in a romantic relationship. Inclusion criteria for participation of ICPs in the present study were (1) having chronic pain for at least 3 months, (2) physically living together with a partner for at least one year and (3) being sufficiently proficient in Dutch. From the couples that were contacted by phone (N = 79[2]), 64 couples were reached and 44 were willing to participate. Two ICPs were excluded, five were not willing to participate and 13 asked to be contacted again in the future.
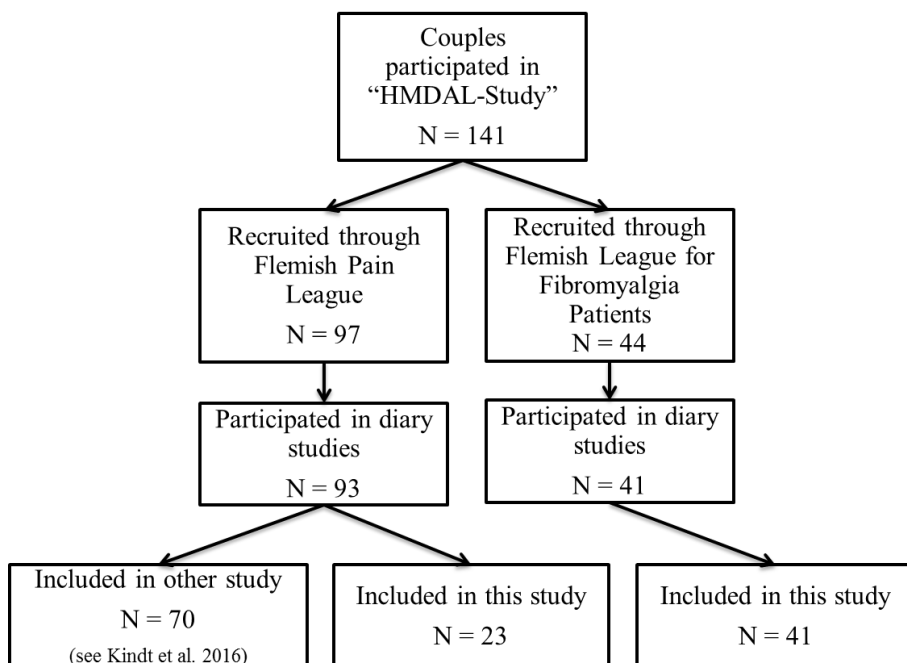
Figure 1. Overview of recruitment.

The majority of ICPs was female (N = 58; 90.6%). The mean age of ICPs and their partner was 48.56 years (SD = 11.78) and 50.78 years (SD = 12.64), respectively. All couples were Caucasian and almost half of them (42.2% of ICPs; 43.8% of partners) reported an education beyond the age of

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[2]Not all members of the FLFP were contacted for this particular study. The intended sample size for the HMDAL-study was 140 couples; the recruitment of participants was ended when this number was reached.

18. More than 80% of the couples was married or legally cohabiting (82.8%). The mean relationship duration was 21.27 years ($SD = 14.51$). The majority of partners was employed ($N = 49$; 76.6%), while only 17.5% of ICPs ($N = 11$) was employed. All ICPs reported more than one pain location (M = 4.75, $SD = 1.47$; range 2–7), with pain in the back (93.87%), neck (92.2%), and lower extremities (70.3%) being reported most frequently. The mean pain duration was 11.23 years ($SD = 10.04$). On a scale from 0 to 10, ICPs reported a mean pain intensity of 6.96 ($SD = 1.20$) and a mean disability of 6.36 ($SD = 2.01$). Twenty-one partners (i.e. 32.8%) also reported pain complaints during the past three months (which is similar to other studies with chronic pain couples, e.g., Issner et al. 2012). Paired-samples t-tests showed that pain intensity (M = 4.21, $SD = 1.56$) and disability (M = 2.21, $SD = 1.57$) were significantly lower in partners compared with the ICPs (all ps <.01; M = 7.38, $SD = 1.29$; M = 6.81, $SD = 2.39$).

Data collection procedure

Participants were contacted by telephone to (1) provide more information about the present study and (2) assess inclusion criteria. The informed consents and baseline questionnaires were administered via a home visit. After completing the questionnaires, further explanation about the diary study was given. Participants were instructed to fill out the diary in the evening for 14 consecutive days. If there were no planned holidays, participants started filling in the diary the day after the home visit. Both partners received a link and a personal code for completing the diary online (through LimeSurvey). When no computer and/or internet was available, or when participants indicated to have no experience with computer/internet, they received a diary booklet on paper[3]. As a sign of appreciation, couples received a fee of 30 euros after completing the 2-week diary. To enhance

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[3] Nine ICPs and 7 partners used the paper version of the diary.

completion rates we offered the opportunity to receive a text message every evening as a reminder for completing the diary.

Out of a potential 1792 end-of-day observations (128 individuals (within 64 couples) x 14 days), a total of 1700 were complete (94.87%). Records completed after 10AM the next morning[4] were deleted, as suggested by Nezlek (Nezlek 2012). Using this criterion 1686 of the 1700 completed observations were included in the analyses (i.e. 99.18% of the completed observations, 94.08% of total possible observations).

Baseline measures

Relationship quality in partners was assessed with the 32-item Dyadic Adjustment Scale (DAS) (Spanier, 1976), which provides a global measure of relational adjustment. The DAS consists of four subscales. Dyadic satisfaction (10 items) measures the tension between partners and the extent to which ending the relationship has been considered. The degree of agreement between partners is called dyadic consensus (13 items). Dyadic cohesion (5 items) assesses shared interests and activities and affectional expression (4 items) reflects the satisfaction with affection and sex in the relationship. Higher sum scores represent higher levels of relationship quality. Heene et al.(2000) confirmed reliability and validity of the overall scale. In this study, Cronbach's alpha for the total score was .93.

Diary measures

All measures described below were collected each evening during 14 consecutive days. For partners, daily goal conflict, perceived gratitude, and helping motivation were assessed, whereas ICPs reported on asking and demanding help, their expressed gratitude towards their partner and daily pain intensity. To estimate item reliability, a multilevel confirmatory factor analysis framework was used that enables the examination of level-specific

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[4] For the paper versions of the diary we relied on the date/time indicated by the participant.

reliabilities (Geldhof, Preacher, & Zyphur, 2014). Within- and between-level alphas are reported.

Partner items

Partners reported every day to what extent helping or supporting their partner interfered with five other (potential) goals on a scale from "0" (not at all) to "6" (extremely). These goals were (1) maintaining relationships with others, (2) participating in leisure activities, (3) performing work-related activities, (4) taking care of own health and (5) pursuing personal growth and development (e.g., learning new skills). The mean score on these 5 items was used as a measure of daily goal conflict. If pursuing one of these goals did not apply for a person that day, there was also an option to answer "inapplicable". The scale was reliable at the within-person ($\alpha = .86$) and between-person ($\alpha = .98$) level.

They further reported whether they perceived gratitude from their partner with pain for the provided help/support during the day: "My partner expressed appreciation" and "my partner showed gratefulness". Items were rated on a 7-point scale ranging from "0" (totally disagree) to "6" (totally agree). The scale was reliable at the within-person ($\alpha = .92$) and between-person ($\alpha = .99$) level.

To measure partners' daily helping motivation, 8 items from the Motivation to Help Scale were selected, which was adapted in a previous study for use with chronic pain couples (Kindt et al., 2015). These items appeared reliable in another diary study with chronic pain couples (Kindt et al., 2016). Every evening, partners received a list of 8 reasons for helping or supporting their partner in pain. They reported on how true these motives were for helping their partner the past day on a 7-point scale ranging from "0" (not at all true) to "6" (totally true). Drawing from SDT, four different types of motivation were distinguished: external motivation (2 items, e.g., "because my partner demanded it from me"), introjected motivation (2 items, e.g., "because I would feel guilty if I didn't help"), identified

motivation (2 items, e.g., "because I think it is important to help my partner") and intrinsic motivation (2 items, e.g., "because I enjoy helping my partner"). Items of external and introjected motivation were summed up to represent controlled motivation to help; items of identified and intrinsic motivation were summed to represent autonomous motivation to help. In line with previous studies (e.g., Kindt et al. 2015, 2016; Weinstein & Ryan 2010), an overall index reflecting the relative degree of autonomous helping motivation was calculated by subtracting controlled motivation from autonomous motivation scores. The scale was reliable at the within-person ($\alpha = .62$) and between-person ($\alpha = .70$) level.

When partners indicated that they did not provide help during the past day, the items measuring helping motivation, goal conflict and perceived gratitude were not displayed in the online system. Out of a total of 896 days (64 partners * 14 days), only for 51 days (i.e. 5.7%) scores for helping motivation and goal conflict were missing because partners reported they did not provide support that day.

ICP items

ICPs reported every day on the extent to which they asked (1 item) or demanded (1 item) help or support from their partner. Both items ranged from "0" (not at all) to "6" (always).

ICPs further reported whether they expressed gratefulness for the received help/support of their partner during the day: "I expressed my appreciation today" and "I showed gratefulness". Items were rated on a 7-point scale ranging from "0" (totally disagree) to "6" (totally agree). The scale was reliable at the within-person ($\alpha = .92$) and between-person ($\alpha = .99$) level.

Items to assess pain intensity were based on the Graded Chronic Pain Scale (Von Korff, Ormel, Keefe, & Dworkin, 1992) and adapted to a daily context. Every evening, ICPs completed an item asking "On average, how much pain did you have today?" and "How intense was your worst pain

today?". Items were rated on a 7-point scale ranging from 0 (no pain) to 6 (worst imaginable pain). The scale was reliable at the within-person (α = .89) and between-person (α = .92) level.

Data analytic strategy

Multilevel models were fitted using PROC MIXED in SAS 9.4 to examine associations between the different predictors and partners' daily helping motivation. Data were analyzed considering two different levels. The *within-couple* level (Level 1) represents the daily variations of our measures, while the *between-couple* level (Level 2) represents the differences between persons or between couples (Bolger & Laurenceau, 2013).

In preparation for data analysis, all daily predictors were centered within clusters (i.e. in this case person-mean centered) (Enders & Tofighi, 2007), as this is considered the most appropriate form of centering when the primary interest involves a Level 1 predictor (i.e. daily helping motivation). This method removes all between-couple variation from the predictor and yields a "pure" estimate of the pooled within-couple (i.e. Level 1) regression coefficient (Enders & Tofighi, 2007). To control for between-couple variation, the mean values for the different independent variables were added as predictors at Level 2 (West, Ryu, Kwok, & Cham, 2011). Level 2 covariates were grand-mean-centered (e.g., relationship quality). No random intercepts and slopes were added in the analyses.

First, a baseline model was estimated to calculate the intraclass correlation coefficient. Next, predictors were added in the model. Diary data not only differ across persons; they are also strictly ordered in time. It is possible that concurrent changes in gratitude or goal conflict and helping motivation are not due to any causal process but may be due to the passage of time, for this reason an autoregressive covariance structure was used in the analyses to take autocorrelation into account (Bolger & Laurenceau, 2013). To examine whether gratitude and goal conflict related to a change in

partners' helping motivation in partners, we controlled for prior day levels of partners' helping motivation.

At Level 1, we controlled for the extent to which ICPs ask or demand help from their partner because of theoretical considerations. Demanding help might put partners under pressure to respond rather in the short-term and might lead them to focus rigidly on a desired outcome, compared with when help was kindly asked. Also daily pain intensity, reported by ICPs, was added in our analyses because the need for help, and hence the motives for helping, might differ between days in which high pain is experienced compared to days with only pain of low pain intensity. Two sets of analyses are performed, one set involving same day predictors (see Table 2, left half) with only helping motivation as lagged variable and another set involving previous day predictors (see Table 2, right half), where also (perceived) gratitude and goal conflict were entered as lagged predictors at Level 1. At level 2, we also added several variables to control for their possible role. Specifically, because this sample includes couples, we controlled for relationship duration and relationship quality. The quality of close relationships has important implications for how well people accomplish their everyday goals (Hofmann, Finkel, & Fitzsimons, 2015) and has also been linked with gratitude (Gordon et al. 2012). As independent samples *t*-tests showed that there were no differences in daily helping motivation according to partner/ICP sex, marital status, having children, education level, work status and presence of pain in both partners we did not control for these variables in the analyses.

RESULTS

Descriptive statistics

Table 1 provides within-couple correlations (based on person-centered diary scores across days) between the variables of interest. The ICC

Table 1. Means, Standard Deviations, ICC values and Within-couple, across-day correlations among Study Variables

|	1	2	3	4	5	6	7	ICC	Mean	SD
1. Relative autonomous helping motivation[P]	-							68.46	2.37	1.75
2. Expressed gratitude[ICP]	.16***	-						52.67	3.71	1.58
3. Perceived gratitude[P]	.26***	.16***	-					70.30	4.36	1.37
4. Goal conflict[P]	-.10**	-.02	-.20***	-				57.31	.64	1.09
5. Asking help[ICP]	.05	.20***	.06	-.02	-			30.42	1.86	1.60
6. Demanding help[ICP]	-.06	-.03	-.01	.04	.46***	-		31.23	.56	1.06
7. ICP Pain Intensity[ICP]	-.02	-.02	-.06	.14***	.22***	.20***	-	47.01	3.45	1.19

Note. The potential number of observations can reach up to 896 (64 couples across 14 days). ICP = measured in ICPs, P = measured in partners, M=mean, SD=standard deviation, ICC=intraclass correlation coefficient. *p<.05, **p<.01, ***p<.001.

represents the percentage of the total variance of a variable that is due to between-couple mean differences (Bolger & Laurenceau, 2013). The amount of within-couple variation can be calculated by subtracting the ICC from 1. Within-couple differences accounted for 31.54% of the variance in partners' helping motivation. The variables with the largest within-couple variation were the extent to which individuals with chronic pain (ICPs) asked (69.58%) or demanded help (68.77%) from their partner.

Multilevel Same-Day Analyses

In our first analysis (see Table 2, left half), same-day effects of partners' perceived gratitude and goal conflict were investigated, while controlling for the extent to which ICPs asked or demanded help, ICPs' pain intensity during the day and the previous day-level of partners' helping motivation. Daily fluctuations in partners' perceived gratitude predicted fluctuations in partners' helping motivation the same day (B=.14, SE=.04, p=.000), indicating that the more gratitude partners perceived on a given day, the more autonomously motivated they were for providing help that day when compared to the previous day. Results further showed that fluctuations in partners' daily goal conflict related negatively to fluctuations in partners' autonomous helping motivation the same day (B=-.14, SE=.06, p=.030), indicating that the more goal conflict partners perceived on a given day, the less they were autonomously motivated to provide help that day compared to the previous day. Asking and demanding help by ICPs, and ICP pain intensity showed no significant association with the daily fluctuations in partners' helping motivation (see Figure 2).

In a set of exploratory analyses, we tested whether expressed gratitude on a given day was associated with partners' perceived gratitude, measured the same day. Multilevel analyses showed that daily expressed gratitude in ICPs significantly positively related to daily perceived gratitude reported by partners (B=.13, SE=.03, p=.000).
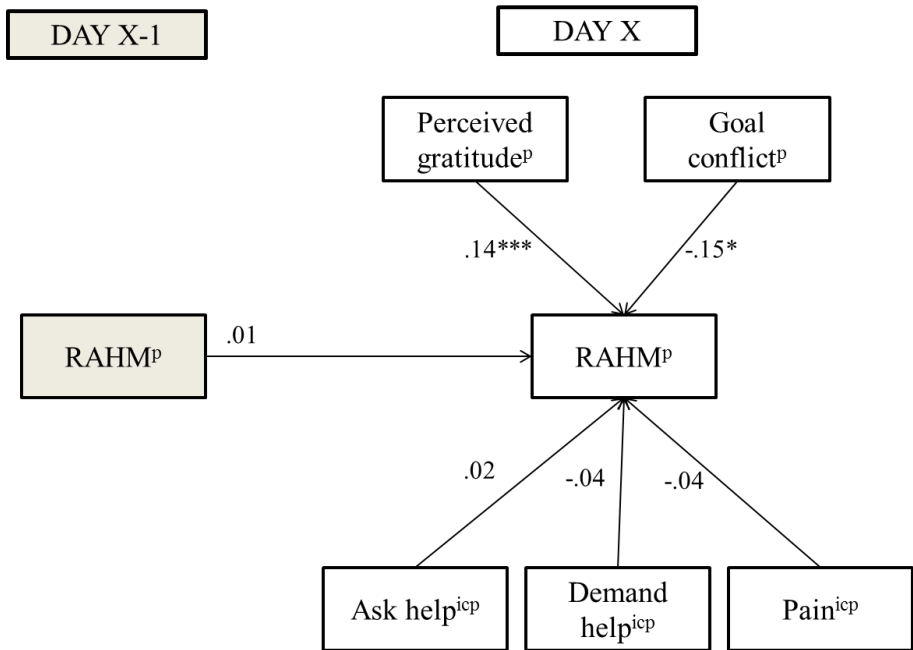
Note. icp=measured in individuals with chronic pain; p=measured in partners

Figure 2. Same-day associations for partners' relative autonomous helping motivation (RAHM).

Multilevel Lagged Analyses

In a second analysis (see Table 2, right half), we investigated the lagged effects of partners' perceived gratitude and goal conflict. That is, rather than introducing both predictors on a given day to account for helping motivation that day, both predictors as reported on the previous day were inserted, thus, allowing for a more conservative test of our hypotheses. Partners' perceived gratitude on a given day significantly predicted partners' helping motivation the next day, indicating that the more gratitude partners perceived on a particular day, the more they were autonomously motivated to provide help the next day (B=.09, SE=.04, p=.039). There was no lagged effect for partners' goal conflict, meaning that the level of goal conflict on a given day was not carried over to partners' helping motivation the next day. Similarly, asking and demanding help by ICPs and ICP pain intensity during

the day showed no significant association with the daily fluctuations in partners' helping motivation (see Figure 3).
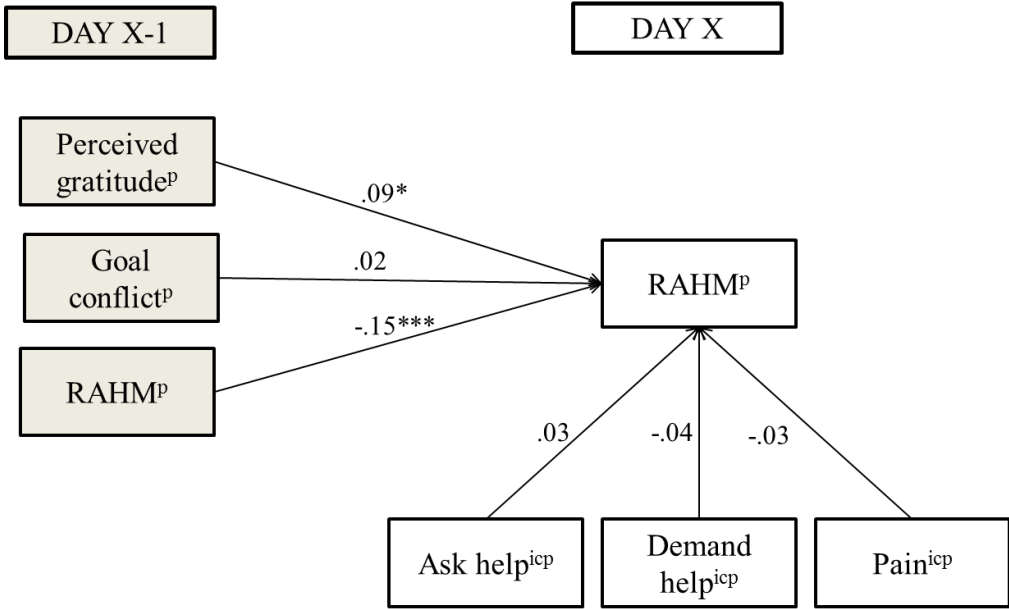
Note. icp=measured in individuals with chronic pain; p=measured in partners

Figure 3. Lagged associations for partners' relative autonomous helping motivation (RAHM).

Supplementary analyses

In a series of supplementary analyses, we examined whether daily variation in expressed gratitude could predict partners' daily helping motivation, above and beyond the effects of perceived gratitude. For the same-day analyses, both fluctuations in perceived (B=.13, SE=.03, p=.003) and expressed gratitude showed a significant positive relation with daily fluctuations in partners' helping motivation (B=.11, SE=.03, p=.001). As for the lagged analyses, fluctuations in previous-day perceived gratitude remained a significant predictor (B=.10, SE=.04, p=.017), whereas fluctuations in previous-day expressed gratitude showed no significant relation with daily fluctuations in partners' helping motivation (B=-.02, SE=.03, p=.532).

Table 2. Multilevel regression analysis: same-day and lagged predictors of partners' relative autonomous helping motivation.

Same-day analyses	RAHM		Lagged analyses	RAHM	
	B (SE)	95% CI		B (SE)	95% CI
Level 1 (within-couple)			*Level 1 (within-couple)*		
Previous day RAHM	.01 (.04)	[-.07; .09]	Previous day RAHM	-.15 (.04)***	[-.24; -.06]
Perceived gratitude	.14 (.04)***	[.06; .23]	Previous day perceived gratitude	.09 (.04)*	[.00; .18]
Goal conflict	-.14 (.06)*	[-.26; -.01]	Previous day goal conflict	.02 (.06)	[-.10; .14]
ICP Asking Help	.02 (.03)	[-.05; .08]	ICP Asking Help	.03 (.03)	[-.04; .09]
ICP Demanding Help	-.04 (.05)	[-.13; .05]	ICP Demanding Help	-.04 (.05)	[-.14; .05]
ICP Pain Intensity	.04 (.05)	[-.05; .13]	ICP Pain Intensity	-.03 (.05)	[-.12; .06]
Level 2 (between-couple)			*Level 2 (between-couple)*		
Mean Perceived Gratitude	.38 (.16)*	[.05; .70]	Mean Perceived Gratitude	.38 (.16)*	[.06; .69]
Mean Goal Conflict	-.06 (.21)	[-.47; .35]	Mean Goal Conflict	-.04 (.20)	[-.44; .36]
Mean Asking Help	.03 (.19)	[-.34; .41]	Mean Asking Help	-.04 (.19)	[-.41; .32]
Mean Demanding Help	-.27 (.28)	[-.82; .28]	Mean Demanding Help	-.28 (.27)	[-.82; .25]
Mean ICP Pain Intensity	-.30 (.28)	[-.84; .25]	Mean ICP Pain Intensity	-.30 (.28)	[-.84; .25]
Relationship Quality	.01 (.01)	[-.01; .04]	Relationship Quality	.01 (.01)	[-.01; .04]
Relationship Duration	-.02 (.01)	[-.04; .01]	Relationship Duration	-.02 (.01)	[-.04; .01]
-2 Res Log Like	1574.5		-2 Res Log Like	1613.2	

Note. RAHM = relative autonomous helping motivation, ICP = individual with chronic pain, 2 Res Log Like = value of -2 times Residual Log Likelihood. CI = confidence interval. *p<.05, **p<.01, ***p<.001.

As a second supplementary analysis, we checked for the potential reciprocal role of helpers' motivation on gratitude and goal conflict, thus investigating reverse effects. Specifically, we examined whether daily fluctuations in autonomous helping motivation predicted changes in daily goal conflict and perceived gratitude as assessed that day (i.e. same-day analyses) and whether daily fluctuations in autonomous helping motivation predicted daily changes in perceived gratitude and goal conflict (i.e. next-day analyses). With respect to the same-day associations, daily fluctuations in partners' helping motivation predicted daily fluctuations in partners' perceived gratitude (B=.17, SE=.04, p=.000) and ICPs' expressed gratitude (B=.21, SE=.05, p=.000) as assessed the same day, while it did not predict daily fluctuations in goal conflict (B=-.03, SE=.03, p=.297).

With regard to lagged effects of partners' helping motivation, there were no significant results found, indicating that partners' helping motivation on a given day was not predictive for partners' perceived gratitude (B=-.03, SE=.05, p=.494), ICPs' expressed gratitude (B=-.07, SE=.05, p=.162) and partners' experience of goal conflicts (B=.01, SE=.03, p=.867) during the next day.

DISCUSSION

Given the benefits associated with volitionally provided help (in contrast to help arising from pressured motives), both for the well-being of helpers and recipients of help (Kindt et al., 2015, 2016; Weinstein & Ryan, 2010), it is important to study determinants of helpers' autonomous helping motivation. To our knowledge this is the first study that investigates determinants of helping motives in couples, using a daily diary approach. This research question was addressed in couples facing chronic pain, given the relevance of helping interactions in the context of the frequent needs for help by the individual in chronic pain (ICP).

The Motivating Role of Gratitude

As a first determinant, the present study investigated the predictive role of (perceived) gratitude in explaining partners' helping motivation. In line with our expectations, if partners perceived more gratitude from ICPs on a given day, they not only reported helping for stronger autonomous helping motives during the same day, but they even provided more autonomously motivated help the next day. Such effects emerged even after controlling for the extent to which ICPs asked or demanded help and their daily pain intensity. These findings indicate that perceiving one's partner as grateful is critical to maintaining one's autonomous motivation to provide help in the future and/or may prevent partners from experiencing the helping as a daunting duty, a "should" they cannot escape.

Notably, ICPs expressed gratitude may not only enhance their partner's willing motivation to provide help, it also has been linked with different well-being benefits. Previous studies show that gratitude is associated with a decrease in depressive symptoms, stress, and negative affect, and an increase in happiness, positive affect, and improved sleep quality in the person expressing gratitude (Cheng, Tsui, & Lam, 2015; Emmons & McCullough, 2003; Seligman, Steen, Park, & Peterson, 2005). Furthermore, felt and expressed gratitude have also been shown to be related to positive relational processes such as feeling more satisfied with (Algoe et al., 2010) as well as being more responsive and committed to one's relationship (Gordon et al. 2012) for both the benefactor as the person expressing gratitude.

One may argue that couples in long-term relationships (as were most couples in our sample) have established routine-based communication patterns and habits, suggesting that expressing gratitude towards one's partner would have minimal effects. Our results, however, showed that expressions of gratitude by ICPs were associated with perceived gratitude in partners from day-to-day and, moreover, even yielded a unique association with autonomous helping motivation on the same day above and beyond the

role of perceived gratitude. Such findings suggest that expressed gratitude influences partners' helping motives even when the gratitude is left unnoticed by the help provider. However, only the contribution of perceived gratitude (but not of expressed gratitude) carried over to the next day, meaning that perceived gratitude not only yields an immediate motivating effect, but that its motivational advantages last for days. Presumably, when partners provide help on a given day they may recall to what extent they felt appreciated for their efforts on previous days, which could then further boost their motivation to put effort in the helping process.

The Motivational Pitfalls associated with Goal Conflict

Apart from gratitude, which we considered a more protective factor that relates to the interpersonal dynamics in couples, we also considered goal conflict as potential threat for providing autonomously motivated help. Different from gratitude, this predictor concerns partners' own functioning. Partners have their own agenda and goals, which on some days may conflict with providing adequate help to their partner in need. Indeed, on days that the provision of help would hinder partners in pursuing other (valued) activities or goals, partners' autonomous helping motivation may be diminished. The findings confirmed this hypothesis, showing that day-to-day variation in experienced goal conflicts was negatively associated with daily variations in partners' (relative) autonomous helping motivation. On days where partners experienced more interference between helping the ICP and other personal goals they strived for, they reported less autonomous motives to provide help compared to the day before. Presumably, when encountering goal interference, partners may more easily feel conflicted about the helping. Because other goals may be given higher priority, on such days, supporting one's partner may be experienced more easily as a burden they would rather want to avoid. Notably, the motivational pitfalls associated with goal conflict only emerged on a given day and did - different from the contribution of perceived gratitude - not carry over to the next day. Technically speaking, no

lagged effect of goal interference was obtained. Presumably, each days brings its own degrees of goal conflict, such that there are no left-overs of previous goal conflicts the next day. Given this is the first study to focus on goal conflict as a potential threat to autonomous helping motivation, future work may need to replicate this finding in more diverse populations.

Implications

The findings of the current study have some clinical relevance. Several studies already demonstrated the benefits of partners having stronger autonomous helping motives for their own-well-being (Kindt et al., 2015), as for the well-being and relational functioning of the help recipient (Kindt et al., 2016; Weinstein & Ryan, 2010). Therefore, enhancing the expression of gratitude towards caregivers may be an important target point for intervention in ICPs. Our results specifically suggest that couples may benefit from expressing more gratitude, but also from learning to pay attention and to make positive attributions when spouses express gratitude to them (see also Gordon et al., 2011). It might be the case that the same processes are present in other relationships, as for example formal caregivers and patients, but further research is needed to investigate this possibility. Likely, gratitude needs to be expressed authentically to yield these motivational benefits. If ICPs show their gratitude in an *instrumental* way, that is, with the aim of enhancing the motivation of their partner and getting something done from them, the expressed gratitude may not be perceived as such and may have a more limited effect on partners' autonomous helping motivation.

Furthermore, it seems important that both partners and ICPs are aware of goal conflicts and communicate about them. Partners are sometimes pressured to divide their time and energy across different sets of valued activities and goals. It seems useful to address partners' experience of goal conflicts in clinical practice, as these may constitute a threat to partners'

autonomous helping motivation and a source of relational conflicts (Gere & Schimmack, 2013; Righetti et al., 2016).

Limitations and future directions

This study has several limitations, which have implications for future research in this area. First, although we were able to demonstrate lagged effects of perceived gratitude on helping motivation, we cannot address causality. A bidirectional relationship may be present between perceiving more gratitude and higher autonomous helping motives. Indeed, Weinstein et al. (2010) reported, using a vignette methodology, that participants were more likely to express gratitude towards the helper if they perceived the helper to be autonomously motivated to help than when the helper was perceived as controlled motivated. Specifically, autonomously motivated, as compared to neutral helpers, elicited more gratitude, while controlled motivated helpers did not differ from neutral helpers in terms of expressed gratitude (Weinstein, DeHaan, & Ryan, 2010). However, in our study, the reverse effects were less convincing than the results in the hypothesized direction. Daily variation in partners' autonomous helping motives was not associated with same-day goal conflict, but only with higher perceived and expressed gratitude during the same-day, but not during the next day. Future studies may manipulate gratitude in the lab by using an interview in couples to elicit low or high levels of gratitude expressions, and examining its effects upon partners' subsequent helping behaviors.

Likewise, it may also be true that partners who provide autonomously motivated help perceive less goal conflicts or are better capable to manage them. There is one study showing that increases in relationship satisfaction benefited everyday goal pursuit by experiencing more control, a higher goal focus, more perceived partner support and more positive affect during goal pursuit (Hofmann et al., 2015). Relational processes may also impact the extent to which providing help is experienced as a hindrance for other goals. Experimental designs are necessary to

ascertain causality with regard to the relationship between experienced goal conflicts and helping motivation. However, using diary methodology has several advantages. These data provide temporal information, which makes it possible to determine the antecedents of daily experiences. By collecting daily information, individuals' experiences are captured in their natural context and closely to their occurrence (Bolger, Davis, & Rafaeli, 2003), which is beneficial for the ecological validity. It furthermore provides the opportunity to investigate the ratio between variations between and within persons of the variables of interest, as was shown in this study. Our study showed substantial day-to-day variation in partner's helping motives, perceived gratitude and goal conflict.

Second, our data only included partner and ICP self-reports of daily behavior. To overcome this limitation, future studies may use observational methods. For instance, goal conflict may be induced in a lab setting (by asking partners to perform several tasks simultaneously including a helping task), and examine the effects on their helping motivation and helping behaviors. Third, all included couples were Caucasian, in a stable relationship, with high levels of average marital satisfaction, which limit the generalizability of our findings. Finally, this study only investigated two potential predictors of helping motivation. Our current list is far from exhaustive but, from a theoretical perspective, the two formed a balanced set of predictors, both in terms of the primary target (i.e. partner him/herself or ICP) and its valence (i.e. protective/motivation-promoting and risk/motivation-threatening). At the same time, we hasten to say that future research could investigate whether other variables may additionally predict partners' helping motivation. That is, also motivation-threatening factors in the couple may receive attention (e.g., daily quarrels), while motivation-enhancing factors in the help provider may also be studied (e.g., daily mindfulness). In addition, the mechanisms accounting for the contribution of gratitude and goal conflict (e.g., daily vitally or daily stress ;Righetti et al., 2016) could also be targeted in future work.

Conclusion

In sum, the present study provides new insights into factors that might enhance partners' daily autonomous helping in a context of chronic pain. Previous research has shown that autonomous help is beneficial for both partners (providers of support) and ICPs (receivers of support) (Kindt et al., 2015, 2016). This study showed that if partners perceive the ICP to be grateful of the provided help on a given day, they are not only more willingly to provide help the same day, they even do so the next day. Furthermore, on days that partners experience a lot of interference between helping the ICP and other life goals, they feel more pressured to provide help that day, which might also affect the quality of help that is provided, a question that may be addressed in future research.

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CHAPTER 8

"WHAT SHOULD I DO FIRST?" THE EFFECT OF MANIPULATED GOAL CONFLICT ON AFFECT, MOTIVATION, AND HELPING BEHAVIOR IN CHRONIC PAIN COUPLES[1]

As helping individuals with chronic pain (ICPs) might interfere with other important goals that loved ones hold, the current study examined the causal effects of experimentally induced goal conflict in partners on their own and ICPs' affect as well as partners' motives for helping and the quality and quantity of provided help.

Sixty-eight couples, with at least one person having chronic pain, were asked to perform two series of household activities. Using a counterbalanced within-person design, the presence of goal conflict in partners was randomly manipulated. Partners were asked to be available for help while simultaneously working on an extra puzzle task (i.e. goal conflict condition) or to be simply available (i.e. control condition). After each series of household activities, couples reported on intrapersonal (e.g., affect) and interpersonal (e.g., helping motives, quantity and quality of provided help) outcomes. In addition, partners' quantity and quality of helping behavior, together with ICPs' pain behavior were coded afterwards.

Results showed that in the goal conflict condition, partners experienced less positive and more negative affect; ICPs reported higher pain intensity, perceived their partner to be less volitionally motivated to provide help and were less satisfied with the received help. Partners, ICPs and independent observers all indicated that during goal conflict partners provided less need-supportive help and observers noted that less help was provided. Addressing partners' goal conflict in clinical practice may be useful to avoid the negative impact on intrapersonal and interpersonal processes.

INTRODUCTION

Romantic partners of individuals with chronic pain (ICPs) face the challenge of providing sufficient and high-quality help (Goubert, 2015; Newton-John, 2013). However, partners often appraise their helping role as stressful, which depletes their ability to provide effective support (Berg & Upchurch, 2007; Jones, Hadjistavropoulos, Janzen, & Hadjistavropoulos, 2011; Ybema, Jan, Kuijer, Roeline, Hagedoorn, & Buunk, 2002). Diary research has indicated that one key factor predicting partners' daily helping behavior and helping motivation is their experienced goal conflict (Kindt, Vansteenkiste, Cano, & Goubert, 2017). Moving beyond such correlational work, the aim of the current experimental study is to test the hypothesis that goal conflict impacts partners' and ICPs' affect and, by extension, affects also the type and quantity of provided help.

Goal conflict in the interpersonal context of pain refers to the extent to which helping one's partner with pain is an obstacle to the pursuit of other important goals, such as spending leisure time with friends or learning new skills at work. In general, goal conflict has been related to worse intrapersonal outcomes, such as lower subjective well-being (Gere & Schimmack, 2013; Riediger & Freund, 2004) and less successful goal attainment (Boudreaux & Ozer, 2012). Although research on interpersonal correlates of goal conflict is still in its infancy (Vervoort & Trost, 2017), there is preliminary and cross-sectional evidence for goal conflict to be related to lower relationship quality (Gere & Schimmack, 2013).

Drawing from Self-Determination Theory (SDT) (Deci & Ryan, 2000), goal conflict may create pressure as the person feels conflicted about dividing his/her limited time and energy across different goals. Such perceived pressure may yield an immediate affective cost, as reflected by enhanced negative and reduced positive affect. Also, under goal conflict conditions, the act of helping may be differentially motivated. If helping one's partner has to be combined with other tasks, the provision of help might be perceived more as a 'should', that is, a daunting duty that one feels

compelled to do rather than a task in which someone is engaged willingly. We therefore propose that goal conflict is more likely to elicit *controlled* helping motives (e.g., "I have to help") instead of *autonomous* helping motives (e.g., "I want to help") (Kindt et al., 2017). Finally, goal conflict may also impact on the type and quantity of provided help. Under goal conflict circumstances, less help may be provided and the quality of that help might be lower. That is, the provided help may be less attuned to the psychological needs for autonomy, competence, and relatedness of the person in pain (i.e. *need supportive* helping behavior) such that the patient would be less satisfied with the help (Vervoort & Trost, 2017).

The current study examines the causal effects of goal conflict in chronic pain couples by manipulating goal conflict in partners using an experimental and multi-informant design. We expect that in the goal conflict condition, compared with the control condition (i.e. no goal conflict), both partners and ICPs will report lower positive and higher negative affect, ICPs will report more pain intensity and evidence more pain behaviors during a set of household tasks. We furthermore expect that self-reported volitional helping motivation, self-reported and observed quality and quantity of helping behavior and satisfaction with received help will be lower in the goal conflict condition, compared with the control condition.

METHOD

Participants

Participants were couples, recruited through the Flemish League for Fibromyalgia Patients (FLFP), a patient organization for individuals with fibromyalgia. Members of the FLFP (*N*=1391) received an invitation letter to participate in studies about chronic pain and quality of life in our lab in February 2015. About 35% (*N*=481) agreed to be contacted by phone. Three hundred eighty-two of them indicated that they were currently in a romantic

relationship. Inclusion criteria for participation of individuals with chronic pain (ICPs) in the present study were (1) having chronic pain for at least 3 months, (2) physically living together with a partner for at least one year and (3) being sufficiently proficient in Dutch. From the couples that were contacted by phone ($N=344$), 245 of the couples were reached, of which 30 had to be excluded, 130 did not want to participate mainly because of the distance to our lab, or because partners had no time. In total, 85 couples agreed to participate in the study. Seventy-six of them filled in the baseline questionnaires two weeks before the experiment and, finally, 72 couples came to the faculty to take part in the experimental phase of the study. Four couples were excluded from the analyses: data from two couples were used as pilot data, one couple terminated participation in the middle of the experiment and one couple turned out not to be living together (For an overview of recruitment details, see Figure 1). The final sample in this study included 68 couples.

In our sample of 68 couples, the majority of ICPs were female ($N = 62$; 91.2%). The mean age of ICPs and their partner was 49.68 years ($SD = 9.63$) respectively 50.87 years ($SD = 9.97$). All couples were Caucasian and four out of ten (42.6% of ICPs; 38.2% of partners) reported an education beyond the age of 18. Eighty percent ($N = 53$) of the couples were married or legally cohabiting. The mean relationship duration was 20.20 years ($SD = 12.47$). The majority of partners were employed ($N = 50$; 73.5%), while only 27.9% of ICPs ($N = 19$) was employed. All ICPs reported at least three different pain locations ($M = 5.51$, $SD = 1.23$; range 3–7), with pain in the back, neck, and lower extremities being reported most frequently (all > 97%). Mean pain duration was 13.03 years ($SD = 11.42$). On a scale from 0 to 10, ICPs reported a mean pain intensity of 7.29 ($SD = 1.00$) and a mean disability of 6.45 ($SD = 1.79$). ICPs' mean pain duration was 13.55 years ($SD = 10.03$). Thirty-seven partners (i.e. 54.4%) also reported pain complaints during the past three months (which is similar to other studies with chronic pain couples; e.g., Issner, Cano, Leonard, & Williams, 2012).

Paired samples t-tests showed that pain intensity (*M*=3.74, *SD*=1.94) and disability (*M*=2.60, *SD*=2.06) were significantly lower in partners compared with the ICPs (*p*s<.01).
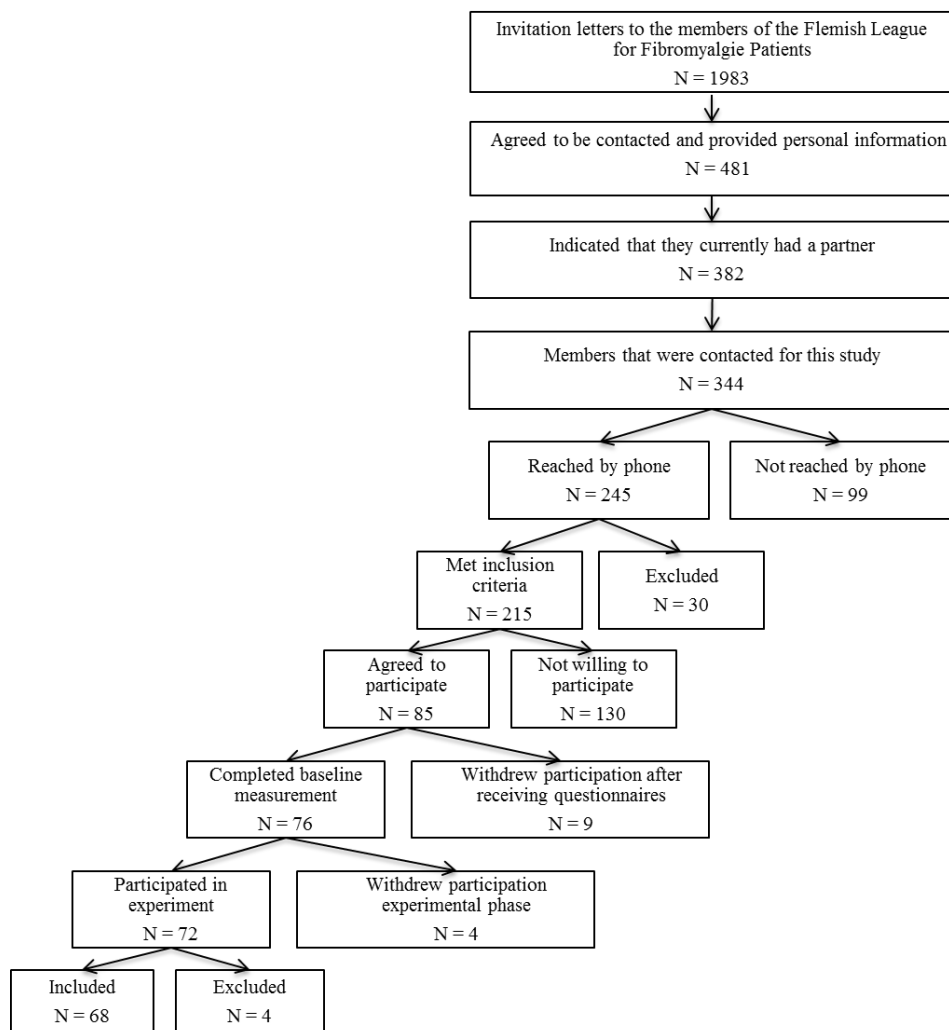
Figure 1. Flowchart of how final sample size was obtained.

Experimental design

Couples attended a single lab session during which they were asked to perform two series of household activities together. Using a within-person design, goal conflict in partners was manipulated in a random and counterbalanced manner. In the control condition, partners were asked to

help the ICP during the household activities, whereas in the goal conflict condition partners were asked to simultaneously perform a puzzle task. Because of the within-subject design, each couple participated in both conditions. The series of household activities differed between the two conditions in order to avoid familiarity with the household tasks.

Upon arrival at the lab, couples were told that the study aimed at investigating how couples handle household activities. Before the experiment started partners and ICPs were separated to answer a series of sociodemographic questions individually. Additionally, in the goal conflict condition, partners were instructed how to solve the puzzle task. After each series of household activities, couples again separately filled out another set of questionnaires with task-specific measures (e.g., affect, helping motivation, need supportive helping behaviors).

Measures

Self-report measures

Affect. Both partners and ICPs reported on how they felt during the performance of the household activities by rating 6 items tapping into positive affect (e.g., proud, happy, relaxed) and 6 items tapping into negative affect (e.g., sad, nervous, scared) (J. Fontaine & Veirman, 2013), that have been used in previous chronic pain studies (Kindt, Vansteenkiste, Loeys, & Goubert, 2016). Items on a 7-point scale ranged from 0 (totally disagree) to 6 (totally agree). Scores were computed by averaging items measuring positive and negative affect, respectively (for Cronbach's alphas see Table 1).

Pain Intensity. After each series of activities, ICPs reported on their experienced pain intensity (i.e. "How intense was your pain during the performance of these tasks?") on a scale from "0" (no pain) to "6" (worst imaginable pain).

Helping Motivation. To measure partners' helping motivation during the tasks, we used the Motivation to Help Scale (Weinstein & Ryan,

2010) that was successfully adapted in a previous study for use with chronic pain couples (Kindt et al., 2015). Eight items, that is, four items assessing controlled motives (e.g., "because I would feel guilty if I didn't help" or "because my partner demanded it from me") and four items assessing autonomous motivation (e.g., "because I enjoy helping my partner" or "because I think it is important to help my partner"), were selected based on previous research with chronic pain couples (Kindt et al., 2016). Partners rated these 8 reasons for supporting their partner in pain during the performance of the household activities on a 7-point scale ranging from "0" (not at all true) to "6" (totally true). ICPs received the same list of reasons and reported on the *perceived* helping motivation of their partner (for Cronbach's alphas see Table 1).

Need Supportive Helping Behavior. To measure need supportive helping behavior (as self-reported by the partner and perceived by the ICP), we developed a 6-item scale based on prior work in health care settings (G. C. Williams, Grow, Freedman, Ryan, & Deci, 1996). In line with recent research (Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017), two autonomy-supportive (AS; e.g., "asked if my partner needed help"), two competence-supportive (CS; e.g., "made useful suggestions about how to handle these tasks") and two relatedness-supportive (RS; e.g., "paid attention to my partner and was involved") items were included which were rated on a 7-point Likert scale, ranging from "0" (not at all) to "6" (extremely). Items were slightly adapted to tap into ICPs' perceived need support. A need-supportive helping behavior scale was created by averaging all six items and was found to be reliable with acceptable Cronbach's alphas (see Table 1) among both partners and ICPs.

Satisfaction with Received Help. After each series of household tasks, ICPs also reported on their satisfaction with the received help (i.e. "to what extent are you satisfied with the received help from your partner?") on a 7-point scale from "0" (not at all) to "6" (extremely satisfied).

Table 1. Correlations between self-report and observed measures in the goal conflict condition (below diagonal) and control condition (above diagonal)

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	AM^{prt}	-	.05	.62***	-.18	.56***	.23	.10	.02	.08	.24	.27*	.14	-.06	.28*	.16
2	CM^{prt}	.15	-	-.03	.48**	.19	-.11	.33**	.15	.05	.08	.17	.08	-.06	-.07	.43**
3	PA^{prt}	.61***	-.07	-	-.22	.28*	.24	.22	.19	-.01	.09	.26*	.07	-.25*	.04	.04
4	NA^{prt}	-.03	.28*	-.25*	-	-.00	-.21	-.03	-.05	-.01	.03	-.05	-.00	.12	.05	.09
5	NSUPP^{prt}	.54***	.26*	.11	-.02	-	.04	.12	.09	.05	.18	.13	.04	.15	.33**	.06
6	AM^{icp}	.16	.06	-.05	-.10	-.04	-	.24	.29*	-.09	.35**	.24	.26*	-.05	-.03	.28*
7	CM^{icp}	.07	.33**	.12	-.12	.08	.18	-	.13	.10	.14	.16	.07	-4	-.18	.24
8	PA^{icp}	-.05	.16	.04	.00	-.09	.41**	.30*	-	-.45***	.09	-.02	-.04	-.19	.03	.09
9	NA^{icp}	.26*	.23*	.20	-.09	.19	.10	.21	-.14	-	.04	.03	.42***	.12	-.22	.04
10	NSUPP^{icp}	.39**	.07	.05	-.03	.36**	.48***	-.08	.11	.09	-	.33**	.33**	.16	.36**	.19
11	SRH^{icp}	.51***	.15	.23	.02	.34**	.25	-.04	-.07	.06	.67**	-	.23	.17	-.01	.29*
12	Pain^{icp}	.16	.03	.08	.08	.10	.02	-.16	-.23	.45***	.14	.22	-	.26*	-.02	.15
13	Pain Beh^{obs}	.02	.09	-.09	.13	.01	-.20	.00	-.37**	.34**	-.12	-.18	.36**	-	.04	.02
14	NSUPP^{obs}	.46***	.32*	.17	.00	.57***	.18	.01	-.02	.12	.50***	.35**	.00	-.05	-	.17
15	Quant. Help^{obs}	.41**	.31*	.18	.05	.43***	.20	.04	.02	.17	.43***	.36**	.11	-.06	.85***	-
α	GC	.91	.70	.86	.75	.60	.83	.58	.78	.75	.72	/	/	/	/	/
α	Control	.82	.57	.86	.69	.59	.81	.52	.79	.80	.58	/	/	/	/	/

Note. prt = partner; ICP = individual with chronic pain; obs = observed; AM = autonomous motivation; CM = controlled motivation; PA = positive affect; NA = negative affect; NSUPP = need supportive helping behavior; SRH = satisfaction with received help; BEH = behavior; Quant. = quantity of.

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Manipulation check. After each series of household tasks, partners were asked to what extent the following statements were true (on a scale ranging from 0 "not at all true" to 6 "totally true): "Time prevented me to fully carry out my tasks", "I felt pressured while performing my tasks", "I felt like having to do too many things at once" and "It was difficult to carry out the assigned tasks as good as I wanted to". We calculated a mean score of these four items to have a measure for our manipulation check. Cronbach's alphas were .82 (goal conflict condition) and .79 (control condition).

Observational assessment

Observational data were collected by videotaping couples while engaging in the household activities. All interactions were broken down into 10-second intervals, with a mean of 35.69 ($SD = 4.91$) rated intervals in the goal conflict condition and 32.58 ($SD = 6.33$) rated intervals in the control condition. Within each interval, partners' quality (i.e. the level of need support) and quantity of provided help was coded, together with ICPs' pain behaviors. A coding manual was available and an intensive training with 10 videos was provided to coders. Both coders watched these videos together, rated videos individually, followed by a discussion of the differences in coding scores. After this training phase, 20% of the videos were double coded by two raters, who each coded another 40% of the remaining videos. Interrater reliability was calculated according to the formula provided by Ekman and Friesen (Ekman & Friesen, 1978) that assesses the proportion of agreement by 2 coders relative to the total number of actions coded by each coder.

Need Supportive Helping Behavior. A coding scheme was developed to assess need-supportive helping behavior and was similar to the items used in our self-report scale for partners and ICPs. In other research contexts, i.e. teaching (Van den Berghe et al., 2013) and parenting (Wuyts, Soenens, Vansteenkiste, Van Petegem, & Brenning, 2017), observed need

support has been reliably coded. In a first phase, a dozen videos were watched by the first author and another independent researcher. Based upon the self-report items and expert opinion, an initial set of items for use in the coding scheme was formulated. In a second phase, two raters (i.e. the first author and another research assistant) coded the first five videotapes. Based on their experiences, some problems were identified (e.g., low frequency of some of the behaviors) and the coding scheme was adapted. In the final coding scheme a distinction was made between the presence ("1") or absence ("0") of Autonomy (AS), Competence (CS), and Relatedness Support (RS). AS was present when the partner asked if the ICP needed help, or when s/he gave a choice how to handle the tasks for example by letting the ICP take the lead. CS was present if the partner gave positive feedback or useful suggestions. RS was present when the partner was listening, attentive and involved. Involvement could comprise actively helping the ICP but also asking questions about the task or physical contact between the partner and the ICP. For each 10-second interval, the coder scored the presence ("1") or absence ("0") of each of these six behaviors. All subscales showed good interrater reliability (Ekman & Friesen, 1978) ranging from .76 to .93. To obtain a more general measure for the quality of help we calculated an overall score of Need Support (NS) by summing up AS, CS and RS; excellent interrater reliability was achieved for this overall score (.95). The full coding system is available upon request.

Amount of Help. The amount of practical assistance provided by the partner was also coded for every 10-second time frame, to have an indication of the quantity of the helping behavior. When partners' practical assistance was absent a "0" score was given, when partners' practical assistance was present (regardless how long or how many times in this 10-second time frame) a "1" score was given. The interrater reliability for the amount of provided help was high (.92).

ICP Pain Behavior was coded based on a scheme used in previous studies with chronic pain patients (De Ruddere, Goubert, Stevens, Amanda,

& Crombez, 2013). Each 10-second time interval was coded for the presence ("1" slightly present; "2" distinctly present") or absence ("0") of different types of pain expression: facial pain expression (e.g., narrowing eyes, raising cheeks), paraverbal (e.g., sighs or moans) and verbal pain behavior (using pain words, such as 'ouch'), active pain behavior (e.g., guarding, holding, or rubbing) and passive pain behavior (i.e. interrupt or avoid performing task). The interrater reliability for ICP pain behavior was acceptable (.69).

Procedure

Two weeks before the experiment, participants who were willing to participate in the experiment were sent an email with the link to an online questionnaire[2] and informed consent. After completing the questionnaire, couples were invited to the faculty for the experimental phase of the study, consisting of two different experimental studies. The first experiment focused upon partners' goal conflict (reported in this paper) and the second experiment, which took place subsequently, examined the process of social exclusion (and is reported elsewhere; De Ruddere et al., in preparation). Before the experiment, couples were asked permission to be videotaped. At the end of these two experiments, couples were debriefed about the goals of the study and the reason why an extra puzzle task was given to partners and were asked, a second time, permission to use the observational data for educational or scientific purposes. As a sign of appreciation, couples received a 30€ fee after participation in both experiments. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

Household activities

The two different series of household activities (i.e. series A and B), each consisting of 4 activities, were counterbalanced across the two experimental conditions. Both series included changing linens on a bed,

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[2] Data of these questionnaires are not reported in this paper.

picking up small objects and carrying a heavy bag, but these activities were performed in a different and set order. Furthermore, in series A participants were additionally asked to cover a table with a tablecloth, while in series B participants were asked to hang coats on a coat stick. These tasks, slightly adapted from earlier work of Romano and colleagues (Romano et al., 1991, 1992), were chosen because they elicit pain behaviors in ICPs and allow the ICP and partner to interact together. Couples received an instruction sheet detailing the order in which the tasks had to be performed. They were allotted 6 minutes to complete the task, which prevented couples from dawdling. ICPs were asked to take the lead during the activities, but they were informed that they could ask their partner for help whenever they wanted to.

Manipulation of goal conflict

Separate instructions were given to partners prior to the goal conflict or control condition. In the control condition partners were asked to remain available for help during the household activities, in case help was requested by the ICP. In the goal conflict condition, partners were told that they received an extra task. This task consisted of making as many puzzles as possible on a tablet, while they were again required to stay available to provide help to the ICP during the execution of household activities. As a cover story, partners were told that we aimed to ascertain their ability to multitask because this skill is often needed in daily life. To further induce goal conflict, partners were informed that individuals who were proficient in multitasking were often more intelligent, competent, and creative and that they would receive their own multitasking scores at the end of the experiment. In both conditions partners were told that they were free to choose to help their partner or not (see Appendix for full instructions). During the performance of the household tasks, the research assistant waited outside the room. After each series of household activities, partners and ICPs

completed the same set of questionnaires, which included a manipulation check.

Data analytic strategy

First, for all observational data, sum scores were divided by the number of coded time intervals, to control for the variation in length of the videos. Subsequently, Pearson's bivariate correlations were conducted to examine the relationships between the included self-report variables and the observational data in both conditions (see Table 1).

Second, repeated measures ANOVA were conducted to examine the effect of goal conflict on different partner and ICP outcomes. Outcome variables were divided in intrapersonal (e.g., affect, pain intensity, pain behavior, positive and negative ICP behavior) and interpersonal outcomes (i.e. quality – helping motivation and need supportive helping behavior - and quantity of provided help). Analyses were repeated controlling for the order in which conditions were offered (control condition – goal conflict condition or vice versa), indicating a similar pattern of results.

RESULTS

Results of the repeated measures ANOVA are shown in Table 2. Preliminary analyses showed that partners' responses on the manipulation check items were significantly different in the goal conflict relative to the control condition ($F(1,66)=42.78$, $p<.001$). Partners found it more difficult to handle both tasks and experienced more pressure when being placed in the goal conflict, relative to the control condition.

Main effects of condition upon intrapersonal outcomes

Results showed that partners experienced lower levels of positive affect ($F(1,64)=4.84$, $p<.05$) and higher levels of negative affect ($F(1,64)=8.65$, $p<.01$) during the goal conflict condition, compared with the control condition. For ICPs only a marginally significant effect of goal

conflict on positive affect was found ($F(1,64)=4.00$, $p=.05$). Results further indicated a significant main effect of condition on ICPs' self-reported pain intensity during the household tasks ($F(1,62)=5.05$, $p<.05$) and on ICPs' observed pain behavior ($F(1,65)=4.37$, $p<.05$). ICPs experienced higher pain levels and were observed to display more pain behavior during the goal conflict condition, compared with the control condition.

Main effects of condition upon interpersonal outcomes

For three out of four helping motivation measures, no significant effect of goal conflict was found. Partners' self-reported autonomous ($F(1,64)=1.08$, n.s.) and controlled helping motivation ($F(1,64)=.67$, n.s.) as well as partners' controlled helping motivation as perceived by the ICP ($F(1,54)=1.51$, n.s.) were not different in the goal conflict versus the control condition. Yet, a significant main effect of condition was found upon partners' autonomous helping motivation as perceived by the ICP ($F(1,55)=5.22$, $p<.05$), showing that ICPs perceived their partners to be less autonomously motivated during the goal conflict condition, compared with the control condition.

The effects for need-supportive helping behavior were remarkably consistent across informants, with partners ($F(1,66)=5.59$, $p<.05$), ICPs ($F(1,65)=28.51$, $p<.001$) and observers ($F(1,65)=251.43$, $p<.001$), respectively, reporting, experiencing, and observing less need-supportive behaviors in the goal conflict, relative to the control condition. Furthermore, a main effect was found of condition upon the observed amount of help provided by partners during the household tasks ($F(1,65)=85.29$, $p<.001$), indicating that partners were observed to provide more help in the control, relative to the goal conflict condition. Finally, a main effect of goal conflict was found upon ICPs' satisfaction with received help ($F(1,62)=8.06$, $p<.01$). In the goal conflict condition, ICPs were less satisfied with the help they received from their partner compared with the control condition.

Table 2. Repeated measures ANOVA indicating the effects of goal conflict upon intrapersonal and interpersonal outcomes

Dependent variables	Informant	Within-subject effects Condition		Descriptives M (SD)	
		F	η^2 (ES)	Goal conflict	Control
Manipulation check	Partner	43.33***	.39	1.84 (1.44)	.71 (1.01)
Intrapersonal Outcomes					
Positive Affect	Partner	4.97*	.07	3.13 (1.32)	3.40 (1.34)
	ICP	3.70Ɨ	.05	2.77 (1.14)	2.97 (1.20)
Negative Affect	Partner	8.84***	.12	.49 (.68)	.31 (.50)
	ICP	.10	.00	1.21 (1.01)	1.16 (1.24)
Pain Intensity	ICP	4.35*	.07	3.58 (1.23)	3.35 (1.12)
Pain Behavior	Observer	4.40*	.06	.40 (.28)	.35 (.25)
Interpersonal outcomes					
Autonomous Motivation	Partner	1.15	.02	3.80 (1.65)	3.98 (1.39)
	ICP	5.32*	.09	3.53 (1.53)	3.81 (1.44)
Controlled Motivation	Partner	1.37	.02	1.36 (1.25)	1.51 (1.11)
	ICP	1.31	.02	1.35 (1.14)	1.39 (1.09)
Need Support	Partner	5.71*	.08	2.78 (.93)	3.07 (.99)
	ICP	27.44***	.29	2.64 (1.27)	3.36 (1.03)
	Observer	254.57***	.79	.50 (.26)	1.03 (.18)
Amount of Provided Help	Observer	68.33***	.51	.24 (.16)	.49 (.26)
Satisfaction Received Help	ICP	8.06**	.11	4.73 (1.41)	5.12 (.90)

Note. Ɨ<p.10, *p<.05, **p<.01, ***p<.001

DISCUSSION

The provision of daily support by a partner to an individual with chronic pain (ICP) may require so much time from partners that it hinders them in pursuing other valued goals (Kindt et al., 2017). At the same time, the pursuit of other valued goals may be an obstacle to partners who wish to be available to the ICP. This experiment sought to investigate the extent to which activated goal conflict constitutes a threat towards partners' and ICPs' intrapersonal and interpersonal functioning. Specifically, we examined whether the induction of goal conflict in a partner, during a set of household tasks, would impact partners' and ICPs' affect, as well as ICPs' pain intensity and observed pain behavior. Further, the study examined whether goal conflict would also affect a host of interpersonal (i.e. help-related) outcomes, including partners' helping motivation, their need supportive helping behaviors, and ICPs' satisfaction with received help.

Intrapersonal Functioning: Affect and Pain

Results indicated that goal conflict caused lower wellbeing in partners (less positive and more negative affect), higher levels of pain and more pain behavior in ICPs. Our findings are in line with yet goes beyond previous correlational work, which found goal conflict to be negatively associated with individuals' subjective wellbeing (Gere & Schimmack, 2013; Riediger & Freund, 2004). This finding is also in line with previous work of Kasser (Kasser & Sheldon, 2009), who reported that the feeling that one has enough time (i.e. time affluence) relates positively to subjective well-being, even after controlling for material affluence (Kasser & Sheldon, 2009). Sufficient time is necessary to engage in activities that promote personal growth and connection with others, activities that typically enhance someone's well-being (Kasser & Kasser, 2002). A lack of time can also lead to cognitive overload and feelings of pressure that may interrupt one's ability to be present in the moment (Brown & Ryan, 2003) and experience ''flow''(Csikszentmihalyi, 1999), both of which facilitate happiness. The

goal conflict condition in this study created (time) pressure, probably diminishing partners' feeling of autonomy. Notably, the goal conflict induction not only affected partners' well-being but also the pain behavior of ICPs. Under circumstances of goal conflict, ICPs perceived physical tasks as more painful and ICPs were observed to displayed more pain behavior.

Interpersonal Functioning: Quality and Quantity of Help

Our first indicator of quality of help was partners' helping motivation. According to Self-Determination Theory perspective (SDT) (Deci & Ryan, 2000), when partners are autonomously motivated to provide help, they experience the helping as more enjoyable, personally valuable and meaningful, while, in the case of *controlled* helping motivation, they provide help to avoid the recipients' criticism or feelings of guilt or to garner external approval. Abundant research in other contexts has found autonomous, relative to controlled, motivation to yield manifold benefits, including behavior persistence, enhanced well-being, and better relationship functioning (Ryan & Deci, 2017; Vansteenkiste, Niemiec, & Soenens, 2010). In the present study, goal conflict failed to affect the helping motivation as reported by partners themselves, yet it impacts the helping motivation as perceived by the ICP. Specifically, ICPs perceived their partner to be less volitionally or autonomously motivated to provide help. Perhaps, partners themselves are less aware of a shift in their helping motives, but the ICPs appeared to perceive a difference. This set of findings is partially discrepant from a previous diary study in the context of chronic pain (Kindt et al., 2017), which found that daily goal conflict was related to lower autonomous, relative to controlled, helping motives from day-to-day.

The more limited effects observed on the motivational outcomes stand in contrast to how partners behaved in the presence versus absence of goal conflict. That is, regardless of the informant, the help provided by the partner was perceived (i.e. ICP) and observed (i.e. observer) to be less need-supportive. The partners themselves concurred with this as they reported

themselves to provide less need-supportive helping behaviors under conditions of goal conflict. Taken together then, goal conflict does affect less the motivational basis for providing help instead yielding a more direct impact on the type of help being provided.

Nevertheless, partners' provision of need-supportive helping behavior, that is, help which is attuned to the psychological needs for autonomy, competence and relatedness, is said to be critical from the SDT-perspective. According to this theory, the satisfaction of these needs are essential for individuals to grow and reach their full potential (Deci & Ryan, 2000). Depending on the degree to which these needs get satisfied or frustrated, one can reliably predict differences, both interpersonally as well as intrapersonally, in well-being, (mal)adjustment and even psychopathology (Vansteenkiste & Ryan, 2013). Partners can be more or less supportive of the needs of their partner with pain. For example, in our study partners appeared more likely to ask their partner whether or not they were in need for help (i.e. autonomy support), to provide positive feedback (i.e. competence support) and to be attentive to what the ICP was doing (i.e. relatedness support) in the absence, relative to the presence of goal conflict. Results further showed that not only the quality but also the quantity of help provided differed in the presence versus absence of goal conflict. Specifically, under circumstance of goal conflict, partners provided less help, as noted by observers. The fact that partners provided lower amounts and less qualitative help can explain why ICPs were less satisfied with the provided help in the goal conflict condition.

These findings are indirectly in line with a recently proposed affective-motivational theoretical account of interpersonal dynamics in the context of pain (Vervoort & Trost, 2017). This model states that individuals with high self-oriented goals (e.g., focus on own goals when experiencing goal conflict), rather than other-oriented goals, when faced with another in pain, may display diminished feedback sensitivity that impedes the receptivity or attention to the needs of the person in pain, potentially

contributing to rigid or inflexible caregiving behavior. Vervoort and Trost (Vervoort & Trost, 2017) further posit that the quality of a caregiving response is also reflected in the non-verbal characteristics as tone of voice, interpersonal distance, touch/physical contact and facial expressions. These characteristics may also affect the nature and effectiveness of caregiving, which is an interesting area for future research.

Limitations

Some limitations in this study deserve attention. First, most of the ICPs were female and all couples were recruited from a self-help organization and thus may not be representative of ICPs and their spouses in primary care or tertiary care centers. Also, only 85 couples of the 215 that were reached and met the inclusion criteria, agreed to participate in the study. The group who did not want to participate may have differed on specific variables (such as relationship quality, pain intensity, disability, or willingness to have spouses involved in pain-related assessment and treatment) that could have affected the results. Second, the generalizability of these results to the home setting is unclear. The extent to which analogue pain-related interactions may reflect similar interactions in the homes of couples in which one partner has chronic pain is unknown. However, we tried enhance ecological validity by imitating a room that looked as natural as possible.

Clinical implications

Having conflicting goals is inevitable (Riediger & Freund, 2004), but these goal interferences should be communicated towards the partner. Also ICPs should be aware of the potential detrimental impact of goal conflicts, if they are in need of help, it may also be important to clearly communicate these needs to the partner and take into account that their partner could have other valued goals at that moment. For ICPs and partners it is important to be aware of attempts of indirect support seeking, because

unfortunately, this behavior tends to be aversive for potential support providers (Barbee, Rowatt, & Cunningham, 1998; S. L. Williams & Mickelson, 2008), who react with unsupportive or rejecting behaviors. Hence, it seems useful to address partners' experience of goal conflict in clinical practice when relational distress is evident, as well as ICPs' indirect support seeking behaviors, as these may constitute a source of unsupportive or negative partner reactions and relational conflict (Gere & Schimmack, 2013). One possibility would be to adjust the expectations of ICPs in feeling entitled to pain related support. Also learning partners to set priorities could be helpful. Their task as primary caregiver could be undesirable and elicit feelings of sadness and helplessness. However, there is room for change to accept this assigned and initially unwanted task, or even see this new role as an enrichment (Vansteenkiste & Soenens, 2015). When partners accept their new identity as caregiver, they will probably experience less interference between their helping role and other valued goals.

In sum, results showed that an induction of conflicting goals in partners diminished partners' wellbeing and also induced ICPs' pain intensity and behavior during a physical task. Furthermore, having to combine another task with helping your partner in pain also showed to be detrimental for the quality and quantity of provided help by partners. Both self-reported and observed quality of help was lower in the goal confliction condition, compared with the control condition. Partners were less attuned to the needs of their partner in pain during interaction and they also provided less support when a second task interfered with their helping role. Addressing partners' goal conflict in clinical practice may be useful to avoid the negative impact on personal and interpersonal processes.

ACKNOWLEDGMENTS

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CHAPTER 9

GENERAL DISCUSSION

In the last decade, it has been increasingly recognized that pain does not exist within a social vacuum (Goubert et al., 2005; Hadjistavropoulos et al., 2011). Extensive evidence is now available that partners play an important role. For instance, considerable attention has been devoted to the investigation of effects of partners' helping behaviours upon patients' pain experience and disability (e.g., Newton-John, 2002). Yet, the experience of partners themselves has received far less attention, with some studies showing that partners are often distressed (Geisser, Cano, & Leonard, 2005; Leonard & Cano, 2006). In spite of these increasing focus on partners it is currently still unknown how partners impact patient outcomes and why partners are distressed. In our view, a motivational approach can provide insight into these questions, acknowledging that partners can engage in helping behaviour for pretty different reasons. Partners' motives for helping constitute the central focus in this dissertation. Drawing from Self-Determination Theory (Deci & Ryan, 2000; Ryan & Deci, 2017), a central question is whether partners engage in helping because they stand fully behind the decision and are volitionally committed to provide help to the patient (autonomous motivation) or because they experience external or internal pressure to provide help (i.e. controlled motivation).

The more specific **aims** of this dissertation were to investigate **(1)** how partners' motives for helping relate to the partners' own wellbeing and relationship satisfaction, **(2)** whether these effects radiate toward pain experience and wellbeing of the patient, **(3)** which processes (i.e. psychological need satisfaction and frustration; help-related variables) can account for these effects, and **(4)** which antecedents predict partners' helping motives. These aims were pursued throughout a series of cross-sectional, diary, and experimental studies in couples where at least one person reported chronic pain, thereby using a multi-informant design. In this general discussion we begin by providing an overview of the key findings of the present dissertation. Rather than discussing findings in a study-wise fashion, we cut across several studies within each aim thereby selectively discussing the findings from different studies as they are relevant to the aim being discussed. In this way, we intended to highlight the communalities and differences in the findings across studies. After giving an overview of our key findings, we then reflect on the theoretical implications, thereby also acknowledging the main limitations of the conducted studies and providing suggestions for future research. Finally, we end this chapter by discussing the clinical implications of the findings and providing a general conclusion.

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GENERAL OVERVIEW OF THE FINDINGS

Aim 1: To Examine the Association between Partners' Helping Motivation and Partner Outcomes

In light of the paucity of previous research examining the wellbeing and distress in partners of individuals with chronic pain (ICP), we made use of the Self-Determination Theory (SDT; Deci & Ryan, 2000) to explain variation in partner outcomes. Specifically, the first aim of this dissertation was to examine the extent to which partners' helping motivation related to diverse individual and relational outcomes. In line with Weinstein and Ryan (2010), an overall index reflecting the relative degree of autonomous helping motivation was calculated by subtracting controlled motivation from autonomous motivation scores in all chapters, except Chapter 8[1]. A variety of studies has shown that the observed effects of an overall measure of motivation can be carried by both the growth-promoting role of autonomous motivation and the growth-undermining role of controlled functioning (e.g., Vansteenkiste, Zhou, Lens, & Soenens, 2005).

In Chapter 3, a cross-sectional design was used to collect initial evidence for the hypothesized relationship between helping motivation and partner outcomes. Findings indicated that partners who helped ICPs out of autonomous, relative to controlled, reasons, reported higher levels of individual wellbeing and relationship quality, and lower levels of distress and feelings of helping exhaustion. Yet, partners' motives and associated functioning may not only differ between partners, but also within a given partner across a series of days. Therefore, in Chapter 4 we moved from a between-person to a day-to-day approach by conducting a 14-day diary study. Partners reported 14 consecutive days on their helping motives, together with different daily outcomes at an individual, relational and help-specific level. Findings indicated that fluctuations in partners' daily

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[1] In this chapter autonomous and controlled motivation were considered as separate dependent variables.

autonomous, relative to controlled, helping motivation related positively to improvements in positive affect and decreases in negative affect, relational conflict, and helping exhaustion. Even after taking into account ICP's daily pain intensity, the significance of partners' helping motives was left intact, attesting to the robustness of the impact of daily helping motivation on partner outcomes.

In sum, using cross-sectional and diary designs, these studies provided initial evidence among partners of ICPs that helping motivation indeed relates to diverse individual and relational outcomes at both the between- and within-person level. With regard to the direction of effects, a bidirectional relationship may be present between partners' helping motivation and individual and relational functioning.

Aim 2: To Examine the Association between Partners' Helping Motivation and ICP Outcomes

Although the findings from Aim 1 indicated that partners' helping motives were systematically related to partner outcomes, it remained to be seen whether these findings would radiate towards the ICP. Therefore, the second aim of this dissertation was to examine whether partners' motives for helping also relate to the wellbeing of the ICP, as the recipient of help.

In Chapter 3, findings revealed that partners' helping motivation was not related with the different ICP outcomes. Because pain intensity is an important variable to take into account when explaining wellbeing in ICPs, we tested for the potentially moderating role of pain intensity (e.g., Kovacs, Zamora, Llobera, & Ferna, 2004). A trend was revealed suggesting that greater autonomous helping motives in partners were related to higher relationship quality in ICPs, but only for those reporting high intensity pain.

In Chapter 4, we employed a diary methodology to examine whether the cross-sectional findings would also apply at the within-person level among ICPs. Different from the cross-sectional findings, a number of direct effects emerged. Specifically, daily fluctuations in partners' daily helping motivation were related to daily improvements in ICPs' satisfaction with and

amount of received help, while predicting decreases in daily relational conflict. After controlling for ICP's daily pain intensity, the effect for satisfaction with received help became nonsignificant. Different from the obtained interaction with pain intensity in the cross-sectional findings in Chapter 3, no evidence was obtained for a significant interaction effect. The lack of interaction findings suggest that ICPs, those with high and those with low pain experiences, benefit from days during which their partner is autonomously motivated to provid help. Our findings further demonstrated that the day-to-day variation in partners' helping motivation was mainly indirectly related to the different ICP outcomes, through changes in ICPs' need-based experiences (to be discussed under Aim 3).

Finally, in Chapter 5, we assessed the longitudinal associations between partners' helping motivation and ICPs' functioning, with ICPs' relationship-based need satisfaction and frustration as intervening variable (see Aim 3). As Chapter 3 and 4 already pointed out that the effects of partners' helping motivation upon ICP outcomes were mainly indirectly present, we did not expect strong direct effects. Findings showed that there was a direct effect of partners' helping motivation upon ICPs' wellbeing across time. More specifically, the initial level of partners' autonomous, relative to controlled, helping motivation predicted an increase in ICPs' wellbeing three months later. With regard to ICPs' distress, no such direct effects were found. Results of the diary study, which used a day-to-day approach (Chapter 4), were more convincing and in contrast with the between-person approaches used in Chapter 3 & 5. It may be that ICPs feel the benefits or disadvantages of partners' motivational attitude more quickly when reflecting on a specific day, instead of a longer period of time. Interestingly, results further showed that the level of ICPs' disability at time 2 predicted a decrease in partners' relative autonomous helping motivation at time 3, three months later.

To summarize, some associations were present between partners' helping motivation and ICP outcomes on different levels. Partners' helping

motivation was related with ICPs' individual wellbeing across time (Chapter 5), ICPs' relational functioning (Chapter 3 - only for those with high pain - & Chapter 4) and with help-specific variables as the perceived amount of received help (Chapter 4). The effects of partners' helping motivation appeared to be more indirectly present, indicating that intervening mechanisms were needed to be included to understand why partners' helping motivation relates to ICP outcomes, an issue which we turn to next.

Aim 3: To Examine the Processes that Explain the Effects of Partners' Helping Motivation upon Partner and ICP Outcomes

Partner outcomes

Having identified that there is indeed an association between partners' helping motivation and diverse partner (i.e. Aim 1) and ICP (i.e. Aim 2) outcomes, our third aim was to uncover whether relationship-based need experiences would function as an intervening variable in these associations. Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017) posits that basic psychological needs (i.e. need for autonomy, competence and relatedness) are essential nutriments for one's intrapersonal and interpersonal functioning. Helping behaviours, when volitionally or autonomously motivated, may be conducive to the satisfaction of each of these needs (Gagné, 2003), with these need satisfactions yielding a positive relation with individuals' wellbeing, as already shown among healthy individuals (Weinstein & Ryan, 2010). The findings of the cross-sectional study (i.e. Chapter 3) provided evidence for the role of need satisfaction (relative to need frustration), with relation-specific need-based experiences fully accounting for the link between autonomous, relative to controlled, motivation and all partner outcomes. In Chapter 4, further evidence for the explanatory role of relationship-based need satisfaction was collected, this time on a day-to-day level. Results indicated that partners' daily autonomous, relative to controlled, helping motivation related to higher relationship-based need satisfaction and lower need frustration, which in turn

both contributed to more daily positive affect and less daily negative affect, less relational conflict and less feelings of helping exhaustion.

ICP outcomes

Within Aim 3, we also assumed that partner's helping motivation could be a "catalyser" for the need satisfaction of ICPs. Based on SDT (Ryan & Deci, 2017), we reasoned that partners' autonomous helping motivation might be associated with improved psychological need satisfaction in ICPs because the basic attitude of autonomously motivated partners is one of openness, curiosity, and sincere receptivity for the patient's preferences and needs. In contrast, partners' controlled helping motivation might be associated with reacting in a more restrictive, less responsive way, thereby missing opportunities to nurture ICP's psychological needs or even actively undermining his/her needs. In Chapter 3, there were no direct effects of helping motivation on ICP outcomes and no mediation models were further tested in this study. In the following Chapter 4 and 5 we slightly adapted our analytical strategy, so that the presence of the total effect of partners' helping motivation in ICP outcomes was not a prerequisite for testing indirect effects (see Loeys, Moerkerke, & Vansteelandt, 2015).

In Chapter 4, findings among ICPs were very similar as for partners, more specifically, partners' daily helping motivation related to a change in ICPs' day-to-day need satisfaction and need frustration. And subsequently, changes in ICPs' need satisfaction and frustration strongly related in the hypothesized direction to changes in ICPs' daily outcomes (with some nonsignificant results for need frustration). Furthermore, in Chapter 5, longitudinal associations were found between partners' helping motivation and ICPs' wellbeing and psychological distress, with ICPs' need frustration as the intervening variable. For ICPs' disability no such pathways were found, in contrast, ICPs' disability predicted a decrease in partners' helping motivation and in ICPs' need satisfaction three months later.

ICP need-based experiences

As for the final goal within Aim 3, we wanted to unravel the mechanisms why autonomously motivated help is conducive to ICPs' psychological need satisfaction and need frustration. An interesting area of research focuses upon the role of social support (Mayseless, 2016), which is often differentiated in three subtypes: instrumental, informational and emotional support (Cohen, 2004). We assume that partners' level of autonomous motivation may be predictive for the amount of received social support by ICPs (Gagné, 2003; Hadden, Rodriguez, Knee, & Porter, 2015). Whether the received support is experienced as need-satisfying or need-frustrating, may partially depend on the skillfulness with which the help is being provided (Rafaeli & Gleason, 2009), as for example the timing of help (i.e. help present on the moments that it is most needed).

In Chapter 6, findings showed that partners' daily helping motivation was related to changes in ICPs' day-to-day received support, which was in turn related to changes in ICPs' daily need satisfaction and frustration. Results further indicated a moderation effect of timing, with stronger positive associations between received social support and need satisfaction for low scores on timing, compared with high scores on timing. Results for need frustration showed a similar partner, with a stronger negative association between received social support and need frustration for low, compared with high, scores on timing. Hence, the critical role of received social support in predicting ICPs' need-based experiences is more pronounced when the provided help was badly timed. Said differently, timing was less crucial in predicting differences in ICPs' need-based experiences when ICPs receive higher, compared to lower, levels of social support.

To summarize, the present dissertation undertook some steps to provide further evidence for why motives for helping relate to diverse wellbeing outcomes in the help provider (i.e. partners) and the help recipient (i.e. ICP). Need satisfaction and frustration, measured within the context of a

romantic relationship, appeared to explain why autonomously motivated partners feel better and are more satisfied with their relationship and it also emerged as an important intervening variable for ICP outcomes. More specifically, ICPs' need satisfaction, measured from day-to-day, was most predictive for ICPs' daily functioning, whereas ICPs' differences in need frustration, at the between-person level, were most predictive for longitudinal changes in ICPs' functioning. The amount of received partner support could partially explain why such autonomously motivated help related to ICPs' need-based experiences. And finally, well-timed help appeared to buffer against the costs associated with low partner support.

Aim 4: To Examine Antecedents of Partners' Helping Motivation

Our fourth and final aim was to build on previous research and investigate potential antecedents of partners' differential helping motives. Diary results, as described in Chapter 7, showed that there was a significant effect of both same-day perceived gratitude (i.e. the received appreciation for providing support) and same-day goal conflict (i.e. the amount of interference between helping your partner in pain and other goals) in the prediction of change in partners' daily helping motivation, whereas only prior-day perceived gratitude predicted a change in partners' helping motivation the next day. Additional analyses showed that the effects of perceived gratitude were not affected by adding the effects of expressed gratitude, which was only significant for the same-day analyses.

While chapter 7 examined the associations between naturally occurring day-to-day variation in goal conflict and same and next day helping motivation, in Chapter 8 we examined the effects of experimentally induced goal conflict. While a third unmeasured variable may account for the relation between goal conflict and helping motivation in the diary study, the strict randomization procedure applied in Chapter 8 limited the possibility of a third variable contaminating the findings. Hypotheses tested in this study were more extensive than what was included in Aim 4.The goal

conflict induction in partners diminished partners' wellbeing[2] and also induced ICPs' pain intensity and behaviour during a physical task. Furthermore, having to combine another task with helping your partner in pain also showed to be detrimental for the quality and quantity of provided help by partners. Both self-reported and observed quality of help was lower in the goal conflict condition, compared with the control condition. Partners were less attuned to the needs of the ICP and less autonomously motivated (as perceived by the ICP) during interaction and they also provided less support when a second task interfered with their helping role.

Although a variety of other variables may be involved, the present findings provide evidence for the role of perceived and received gratitude for provided help in predicting partners' helping motives. Using diary and experimental designs, it was shown that the experience of goal conflict by partners related to less self-reported (Chapter 7) and less perceived (Chapter 8) autonomous helping motives.

THEORETICAL REFLECTIONS

Reflections on the Role of Partners' Helping Motivation in Couples Facing Chronic Pain (Aim 1 & 2)

The Role of Partners' Helping Motivation

By using a motivational perspective (Ryan & Deci, 2017), we aimed at investigating whether partners' type of helping motivation could predict personal and relational wellbeing in chronic pain couples. Overall, the findings presented within this dissertation confirmed the existence of such associations by demonstrating an association between partners' helping motivation and partners' individual, relational and help-specific functioning (Chapter 3 and 4), a finding that emerged at both the between- and within-person level in partners. Findings not only demonstrated that partners who

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[2] Not for ICPs: only a marginally significant (p<.10) effect for ICP positive affect was present.

reported more autonomous helping motives, reported better individual wellbeing, less distress and a better relationship quality, but also indicated that on days that partners had higher autonomous helping motives, they also reported better individual wellbeing, less relational tensions, and less feelings of helping exhaustion, compared with their person-mean level.

These findings are in line with previous work, mainly in the domain of prosocial behaviour (i.e. helping strangers or persons with whom you are not having a close relationship). Higher autonomous motives for prosocial behaviour in elementary school children related to greater empathy and helping satisfaction (Ryan et al., 1989). Subsequent work among adults who did volunteer work, showed that more volitional motives for volunteering were related to greater satisfaction, less intentions to quit (Millette & Gagné, 2008) and more effortful helping (Bidee et al., 2013). Weinstein & Ryan (2010) tested the same hypothesis across four different studies assessing prosocial behaviour under various conditions (natural and experimental). Interestingly, helping others, per se, did not generally relate to subjective wellbeing, vitality, or self-esteem. Individuals were not better off when they engaged in more helpful behaviours, nor were they better off on days when they helped someone compared to days when they did not. Their results revealed consistent and positive findings for the impact of autonomous motivation on wellbeing, suggesting that it may not be the act of helping itself that is responsible for yielding increases in wellbeing for the helper, but rather the specific motivational characteristics of the helping act seemed to determine its impact on wellbeing. In the context of chronic illness, there is also some evidence that spouses of patients with cancer who have higher autonomous caregiving motives experience less depressive symptoms (Kim, Carver, Deci, & Kasser, 2008), or even report better mental health five years later (Kim, Carver, & Cannady, 2015).

While we consistently found evidence for an association between partners' helping motivation and diverse partner outcomes, the findings regarding the relation with the outcomes of individuals with chronic pain

(ICPs) were more variable and mostly indirect in nature. With regard to direct associations, we found evidence that partners' autonomous helping motivation predicted an increase in ICPs' wellbeing three months later (Chapter 5), a better relationship quality for ICPs with high intensity pain (Chapter 3) and that daily variations in helping motivation co-varied with the changes in ICPs' daily relational conflicts and the perceived amount of received help during the day (Chapter 4). This is in line with the work of Weinstein & Ryan showing that recipients of help (i.e. university students) experienced more positive affect, greater vitality and more self-esteem after receiving autonomously motivated help (Weinstein & Ryan, 2010). The difference with our studies was that help was given by a stranger in an artificial context (i.e. in the research lab), whereas our participants reported on real-life, naturally occurring helping interactions with their romantic partner in general (Chapter 3) or from day-to-day (Chapter 4). Most of our results showed indirect associations between partners' helping motivation and ICP outcomes. Maybe this is because the predictive power of helping motives is undermined as romantic partners know each other very well and as a consequence, the direct associations between partners' helping motivation and ICP outcomes are diminished.

Methodological Issues

A) <u>What about reverse effects?</u>

Although not systematically addressed in our chapters, the possibility of having reverse effects in our data could be further investigated. A bidirectional relationship between partner and ICP outcomes and partners' helping motivation could be present.

As a supplementary analysis of Chapter 4, we checked for the potential reciprocal role of partners' helping motivation and daily partner outcomes, thus investigating reverse effects. Specifically, we examined whether fluctuations in affect, conflict and helping exhaustion predicted changes in partners' daily autonomous, relative to controlled, helping

motivation. Daily fluctuations in partners' helping motivation were predicted by daily fluctuations in partners' relational conflict (B=-.08, SE=.03, $p<.001$) and by daily fluctuations in partners' helping exhaustion (B=-.10, SE=.03, $p<.01$), but were not predicted by daily fluctuations in partners' positive (B=.04, SE=.03, n.s.) and negative (B=-.02, SE=.03, n.s.) affect. Taken together, only in 50% of the outcome measures assessed in partners, reverse effects were present. Hence, the results in the hypothesized direction were more convincing for partners. Also for ICP outcomes, only in for four out of six outcome measures reverse effects were present. Supplementary analyses showed that ICPs' daily positive affect (B=.07, SE=.04, $p<.05$), satisfaction with received help (B=.06, SE=.03, $p<.05$), amount of help (B=.09, SE=.03, $p<.01$) and ICPs' daily conflict (B=-.13, SE=.03, $p<.001$) predicted changes in partners' daily autonomous, relative to controlled, helping motives.

Although not reported in Chapter 5 (as the focus in this chapter was mainly on Aim 2), also partners completed three waves of questionnaires at three time points spread across 6 months. Partners not only reported on their helping motivation, but also on their functioning (i.e. different aspects of wellbeing, psychological distress and relationship quality). A series of additional structural models were tested, in a very conservative way by controlling for initial levels of all variables (helping motivation and partner outcomes) in each model and for all within-time associations, together with the absence or presence of chronic pain in the partner themselves. When estimating a model with partner wellbeing, no significant effects of partners' autonomous, relative to controlled, helping motivation on partners' wellbeing[3] were present across time; also no reversed effects were present. Next, a model with partner distress[4] and partner-reported relationship quality[5] showed again no significant effects of partners' autonomous, relative to controlled, helping motivation. However, some reverse effects

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[3] Model fit: $\chi^2(45)=62.50$, RMSEA=.05, CFI=.97, SRMR=.06
[4] Model fit: $\chi^2(45)=77.60$, RMSEA=.07, CFI=.97, SRMR=.08
[5] Model fit: $\chi^2(2)=.29$, RMSEA=.00, CFI=1.00, SRMR=.00

emerged. Partners' distress at time 1 predicted a significant decrease in partners' autonomous helping motivation at time 2 (β =-.23, p<.001). Next, partners' relationship quality at time 1 predicted an increase in partners' autonomous helping motivation at time 2 (β =.21, p<.01). These findings are not in line with another longitudinal study about family members' caregiving motivation in the context of cancer (Kim et al., 2015). This study showed that among male caregivers, autonomous helping motives, measured two years after their relatives' cancer diagnosis, related to better mental health five years later, apparently because these motives led caregivers to find greater peace and meaning in life.

B) <u>What about Social Desirability?</u>

We tried to avoid effects of social desirability by visiting most couples at home (those samples used in Chapter 4-7). During this home visit we discussed the questionnaires and diary items together and explained to them that honest answers were most valuable for our research. Partners and ICPs were asked to fill in their questionnaire and diary independently. They had no insight into each other's diary, as they were given a separate link and token to log in. Having said this, we cannot exclude that social desirability response tendencies might contaminate the findings of the present dissertation, which is one of our limitations. Yet, if this were the case, partners may have overreported their levels of autonomous helping motivation, which may actually have reduced the possibility of finding significant effects. Further, we would argue that the potential overestimation of autonomous motivation and underestimation of controlled motives is less of an issue in a diary study. The bias of social desirability might be larger when partners are asked to fill in questionnaires about their helping motivation in general, than when they are asked to fill in items with respect to a limited and short time frame (e.g., during the past day). Assuming that everyone can have a bad day, it is less "disgraceful" to be honest with regard to your daily helping motivation compared with your helping motives in general.

Further, we would like to note that we also measured the perception of partners' helping motivation in ICPs from day-to-day (these findings are not reported in Chapter 4, 6 & 7). To do so, we used the exact same 8 items as those used among partners themselves, yet adapting them slightly to make them amendable for ICPs (e.g., "I think my partner helped/supported me today because…"). The inclusion of this measure allowed us to inspect its degree of convergence with the partners' report of motivation. If social desirability tendencies would be at work, we would expect both measures to be unrelated, as ICPs may provide a more accurate picture of their partners' motivation. Interestingly, all correlations between the aggregated scores (total diary sample of N=134) for helping motivation of partners and ICPs were significant, with r=.34** (p<.001) for relative autonomous helping motivation, r=.33*** (p<.001) for autonomous helping motivation and r=.21* (p<.05) for controlled helping motivation. Similar items were used in our experimental study (Chapter 8) to measure perceived helping motivation in ICPs. Also in this study partner and ICP-reported helping motives significantly correlated when using an aggregated score of both conditions with r=.21 (p<.10) for autonomous helping motivation, r=.35** (p<.01) for controlled helping motivation and r=.33** (p<.01) for relative autonomous helping motivation. If social desirable responding would be fully operative, a null-relationship between partner and ICP-reported motivation could be expected. This suggests that the influence of social reliability in reporting helping motivation seems to be minimally present.

Future Directions

Although the present dissertation did systematically provide evidence for an association between partners' helping motivation and diverse partner and ICP outcomes, there is still more research needed.

Generalizability. An important limitation in this dissertation concerns our sample characteristics. Our samples consisted mainly of white, heterosexual, middle-class couples, who were generally satisfied within their

relationship. Such a selection bias may possibly explain the higher averages for autonomous helping motivation in partners as partners with more pronounced controlled motives may be no longer together with their ICP. However, samples of previous studies were similar to the present ones in terms of response rates, sex and age (e.g., Lyons, Jones, Bennett, Hiatt, & Sayer, 2013). In spite of such similarity, it remains to be seen whether the present findings generalize to other samples who are less relationally satisfied, or for instance in partners with a same-sex relationship, with a lower socio-economic status, or with another chronic condition such as cancer or multiple sclerosis.

Furthermore, research examining clinical populations, as couples where at least one partner has chronic pain, would benefit from including matched non-clinical couples. This would allow for testing whether the motivation-wellbeing associations in clinical samples could be generalized to non-clinical samples. Moreover, it might be interesting to examine whether the helping motives of partners are more relevant for clinical samples (who face higher support needs and are more at risk for the potential disadvantageous effects of helping interactions) compared with non-clinical samples. Having a matched control group would also allow us to compare partners in the clinical and the non-clinical group with regard to their quality of life, distress and relationship quality. There are some studies were group comparisons were reported. Leonard and colleagues compared couples where both the ICP and the partner had chronic pain complaints with couples where only the ICP had chronic pain. Results showed that the presence of pain in the partner accounted for within-couples differences on psychological distress. More specifically, in couples where only the ICP reported pain, ICP psychological distress was higher than their partners, whereas when both partners reported pain, there was no such difference (Leonard & Cano, 2006). Another study, in the domain of dementia, compared the physical health of caregivers with demographically similar noncaregivers (Vitaliano, Zhang, & Scanlan, 2003). This study showed that

caregivers exhibited a slightly greater risk for health problems than did the group of noncaregivers.

Person-centered approaches. In most chapters of this dissertation we used a relative[6] measure for autonomous helping motivation, by subtracting the controlled motivation scores from the autonomous motivation scores. One limitation of making this choice is that it does not inform the reader whether the observed association is carried by the positive contribution of autonomous motivation, the negative contribution of controlled motivation or by both. A variety of previous studies have shown, consistent with our findings[7], that the observed effects of this overall measure can be carried by the effects underlying both autonomous and controlled functioning (e.g., Vansteenkiste et al., 2005). The use of a relative score is also preferable when it is needed to reduce the number of parameters to be estimated to have better fit indices (for example for Chapter 5). An interesting avenue for future research could be to use a more person-centered instead of variable-centered approach for identifying motivational profiles.

New studies could gain further insight whether a particular combination of scores on autonomous and controlled motivation is critical.

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[6] A similar approach is to use the "RAI" (relative autonomy index; Soenens & Vansteenkiste, 2005), which provided similar results. To calculate the RAI, the external subscale is weighted -2, the introjected subscale is weighted -1, the identified subscale is weighted +1, and the intrinsic subscale is weighted +2. In other words, the controlled subscales are weighted negatively, and the autonomous subscales are weighted positively. The more controlled the regulatory style represented by a subscale, the larger its negative weight; and the more autonomous the regulatory style represented by a subscale, the larger its positive weight.

[7] Additional analyses for the first two empirical chapters (Chapter 3 and 4) were performed to get a more detailed insight in the motivational variables carrying the effect of the overall relative autonomy index. Findings for Chapter 3 suggest that our effect is carried by both the (opposite) effects of autonomous and controlled motivation. All contributions were in the expected direction and reached significance for all main effects of autonomous motivation and controlled motivation, but not for the interaction effect with pain intensity. As for Chapter 4, similar findings emerged. For almost all partner and ICP outcome variables our effect was carried by both the (opposite) effects of autonomous and controlled motivation.

More recent work within the SDT-tradition has contrasted individuals with different motivational profiles (e.g., Haerens, Kirk, Cardon, De Bourdeaudhuij, & Vansteenkiste, 2010; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). Such studies have shown that more motivation is not necessarily better. That is, although individuals may display elevated levels of controlled motivation compared to others, while being equal in terms of autonomous motivation, the additional presence of controlled motivation does not yield more beneficial functioning, on the contrary. Future studies in the area of helping motivation could also examine such motivational profiles in greater detail. For instance, cluster analysis would allow us to divide partners into different groups according to their motivational profile as for example a good quality motivation group (i.e. high autonomous, low controlled); a poor quality motivation group (i.e. low autonomous, high controlled); a low quantity motivation group (i.e. low autonomous, low controlled); and a high quantity motivation group (i.e. high autonomous, high controlled) (see for example Vansteenkiste et al., 2009). It may for example be that partners of ICPs in the good quality motivation group are not different in terms of wellbeing, distress and relationship quality from partners of individuals without chronic pain.

Gender. A limitation of this dissertation is that most of our ICPs were female (ranging from 75% to 91% across all chapters) and we, hence, rely our conclusion on mostly male caregivers. Much of the previous work in pain regarding sex differences focuses on biological factors, yet it is also acknowledged that psychosocial issues are important. In many cultures, women are expected to be the family caregivers (Feeney & Collins, 2003; Pinquart & Sörensen, 2006); thus, women's caregiving behaviours might be more bounded by social rules rather than individual differences in caregiving motives (Kim et al., 2015). Researchers have also found that women receive less emotional support from their husbands than men do from their wives

(Vinokur & Vinokur-Kaplan, 1990). But do men and women consider the same behaviours by a partner to be reflective of support? According to a study of Mickelson it is rather the gender role attitude, together with the participant's sex, that were needed to differentiate the role of spousal support in marital quality (Mickelson, Claffey, & Williams, 2006). For instance, women with traditional gender role attitudes consider housework to be the woman's responsibility. By contrast, women with egalitarian gender role attitudes consider housework a shared domain. Cross-cultural research as well as changing contextual and personal circumstances demonstrate that men and women can be quite flexible in their care. Thus, both sexes show a definite potential for engaging in a variety of types of care and hence may engage in quite similar care if circumstances or contexts require it (Mayseless, 2016). Despite sexual differences in biological and neurological mechanisms, men are in principle as capable of giving care as women and can provide good quality support to the same extent as women (Mayseless, 2016). Although sex never played a significant role in our analyses, future research with chronic couples could benefit from collecting data in a more balanced sample including more male ICPs and/or more female partners. Within humans, socially and culturally constructed meanings of being and acting as a man or a woman (i.e. gender) should help us understand sex-related differences in pain (Bernardes, Keogh, & Lima, 2008). When more male ICPs are included, moderation analyses with sex or gender roles could be pursued allowing us to check whether the associations hold for both male and female partners.

Causality. Although cross-sectional, diary and longitudinal methodologies were used to examine the role of partners' helping motivation in predicting diverse partner and ICP outcomes, all of these methods produced findings which are correlational in nature. Unfortunately, these correlational designs precluded conclusions about the direction of effects. For this reason, future experimental research, that primes partners' helping

motivation, is needed to infer whether partners' helping motivation precedes rather than follow from partners' individual and relational wellbeing. Based upon our additional analyses with regard to reversed effects in the diary (Chapter 4) and longitudinal study (Chapter 5) we probably could conclude that the relationship between partners' helping motivation and partners' wellbeing is bidirectional in nature. So maybe when partners are stressed, they have limited resources to provide help, whereas when partners feel good, they probably are more able to easily assist ICPs, or find it less burdensome to provide help from day-to-day. Results with regard to ICP outcomes are less convincing regarding this bidirectional or reverse relationship (if we consider the results of the longitudinal study, as reported in Chapter 5). It may, however, also be that ICPs who are more satisfied with their relationship behave in ways (for example being interested in or sharing activities with the partner, having constructive conversations and agreements, …) that contribute to the satisfaction of their partners' psychological needs and autonomous helping motivation.

Multi-method approach. We included one observational-experimental study of partners' helping behaviour in this dissertation, but five out of six empirical studies were conducted using only self-reports. This may have inflated some of the observed associations due to shared method variance. Ideally, any future study would include a combination of self-reports and observed couple interactions to assess the discrepancies between questionnaire and observational data.

Intervention studies. As chronic pain couples are not only confronted with the pain itself, but also with decreased partner and ICP psychological wellbeing and relationship quality (Leonard & Cano, 2006), it seems warranted to target the reduction of partner stress and improvement of relationship quality as part of clinical treatment (Goubert, 2015). Couple interactions can affect both partner and ICP outcomes and this should be

taken into account when developing treatment programs for ICPs (Prenevost & Reme, 2017). One way of doing this is to include partners in the treatment process of ICPs. Several examples demonstrated the effectiveness of such approaches by including training in dyadic coping skills (e.g., effective strategies for requesting and providing partner assistance) (e.g., Abbasi et al., 2012; Keefe et al., 2004; Miller, Cano, & Wurm, 2013). However, few randomized trials have been designed to compare couple- and patient-oriented approaches, making it difficult to evaluate the "relative" efficacy of a couples approach (Martire, Schulz, Helgeson, Small, & Saghafi, 2010). Martire and colleagues (2010) discovered that the majority of intervention studies failed to describe how theory was used in the development of intervention materials. Other researchers also have noted that couple interventions are rarely conceptually driven, nor do they often identify specific targets for change (Fisher, 2006). A few things are important for future intervention studies. First, the specific targets for change (e.g., gratitude expression, goal conflict, helping motivation, …) need to be described and embedded within a theoretical framework (e.g., the Self-Determination Theory; Ryan & Deci, 2017). And second, assessing change in outcome measures, for both the patient and partner is crucial to evaluate the intervention. For example, a lack of improvement for the patient, may be (partially) explained by negative or unexamined effect upon the partner (Martire et al., 2010), potentially leading to negative marital interactions or to inadequate partner support for the changes that patients have made.

Reflections on Explanatory Processes (Aim 3)

Needs as Intervening Variable

Apart from demonstrating direct contributions of partners' helping motivation in the prediction of partner and ICP outcomes, the present research also uncovered evidence for the role of relationship-based need satisfaction and frustration as explanatory processes which account for the observed associations. Specifically, partners' autonomous helping

motivation was related with higher relationship-based need satisfaction and lower relationship-based need frustration, which in turn related to partners' individual and relationship functioning, either between or within partners from day-to-day. This finding is indirectly in line with previous work showing that someone's autonomy orientation (i.e. a general tendency towards volitional engagement in activities) was strongly related to engagement in prosocial behaviour (i.e. number of volunteered hours) and that this relationship was partially mediated by need satisfaction (Gagné, 2003). In the domain of prosocial behaviour, it was shown that volunteer motivation was related with life satisfaction through the need satisfaction experienced during volunteering (Kwok, Chui, & Wong, 2012). And similarly, in a sample of university students, daily need satisfaction fully mediated the relation between autonomous helping motivation and participants' wellbeing (Weinstein & Ryan, 2010).

For ICP outcomes, similar findings were present. Changes in ICPs' need satisfaction and frustration strongly related in the hypothesized direction to changes in ICPs' daily outcomes, but need frustration played a less significant role. Different with Chapter 5 (longitudinal study), ICPs' relationship-based need frustration emerged as the more important intervening variable, instead of need satisfaction. Based on SDT (Ryan & Deci, 2017), we reasoned that partners' autonomous helping motivation might be associated with improved psychological need satisfaction in ICPs because the basic attitude of autonomously motivated partners is one of openness, curiosity, and sincere receptivity for the patient's preferences and needs. Partners are more likely to take the frame of reference of the patients, thereby patiently attuning the timing, frequency and amount of provided help and support according to the patients' situation. Consistent with such a reasoning, previous studies in the sports context have shown that greater autonomous sport motivation relates to more prosocial behaviour towards one's opponents (Vansteenkiste, Mouratidis, Riet, & Lens, 2014). In contrast, controlled motivated partners are more likely to adopt a tunnel

vision, thereby placing their own standards and agenda more central. As a result of a controlled helping motivation, partners would react on these days in a more restrictive, less responsive way, thereby missing opportunities to nurture ICP's psychological needs or even actively undermining his/her needs. Indeed, when adopting such a tunnel vision, partners are more likely to intervene and take over, thereby neglecting patients' rhythm (eliciting autonomy and relatedness frustration) and conveying a sense of distrust (eliciting a sense of failure).

While traditionally research within SDT has focused on the role of need satisfaction in promoting wellbeing, more recently this focus has shifted with increasingly more studies uncovering the costs associated with need frustration (Vansteenkiste & Ryan, 2013). A lack of need satisfaction does not necessarily imply that someone's needs are actively frustrated. Even when individuals experience low need frustration, this does not necessarily means that the needs are satisfied. Recent studies suggest that need frustration is, beyond a lack of need satisfaction, uniquely predictive for feelings of distress and exhaustion (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Cordeiro, Paixão, Lens, Lacante, & Luyckx, 2016; Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013). The unique role of need frustration in predicting partners' and ICPs' outcomes was supported in our studies. In fact, both relationship-based need satisfaction and frustration explained partners' daily wellbeing and distress. Also for ICPs, need satisfaction was important for all outcomes, whereas the indirect effect through need frustration was only significant for relational conflicts. Similarly, in Chapter 5, ICPs' need frustration was predictive for both ICPs' wellbeing and distress over time, whereas ICPs' need satisfaction only predicted ICPs' distress. Moreover, our results are in line with the findings in couples without chronic pain, confirming that relationship-based need satisfaction and frustration played a differential role in individual and relational wellbeing (Vanhee, 2017). This dissertation demonstrated that relational conflict was not only affected by need dissatisfaction (i.e. passive

indifference towards each other's needs; Patrick, Knee, Canevello, & Lonsbary, 2007), but also by partners' more active and direct attempts to undermine each other's needs (i.e. need frustration).

Finally, our results are also in line with the SDT claim that the basic psychological needs for autonomy, competence, and relatedness are universal and therefore play a role in the wellbeing of all individuals (Ryan & Deci, 2017). A lot of studies provide support for these claims and for example showed that need satisfaction fosters wellbeing, whereas need frustration is predictive of distress across individuals with different cultural backgrounds (Ahmad, Vansteenkiste, & Soenens, 2013; Chen et al., 2015). Studies even demonstrated that need satisfaction is beneficial for those individuals who state that they don't value these needs or that they have little desire for these needs to be met (Chen et al., 2015; Van Asshe, van der Kaap-Deeder, Audenaert, Schryver, & Vansteenkiste, 2017). The present findings add to this body of research by providing further evidence for SDT's universality claim among patients with different pain complaints and partners throughout the different chapters in this dissertation. This is in line with other work in the context of chronic pain (Uysal, Ascigil, & Turunc, 2017) showing that need satisfaction in ICPs related to better wellbeing independent of pain intensity.

Provided and Received Help as Explanatory Mechanism

As for the final goal within Aim 3, we wanted to unravel the mechanisms why autonomously motivated help is conducive to ICPs' psychological need satisfaction and need frustration. Findings of Chapter 6 showed that partners' daily helping motivation was related to changes in ICPs' day-to-day received support, which was in turn related to changes in ICPs' daily need satisfaction and frustration. Results further indicated a moderation effect of timing. Previous studies already showed that greater autonomy in support provision is related with higher levels of support provision (Bidee et al., 2013; Gagné, 2003; Hadden et al., 2015; Weinstein & Ryan, 2010). Our study extends this work by showing that autonomous

help is also related with the level of received support as perceived by the recipient of help. The paradox of social support, as referred to in Chapter 1 & 2, reflects the sometimes mixed findings of received support (Mcclure et al., 2014). Some studies have found null or even maladaptive effects of receiving support (Bolger & Eckenrode, 1991; Bolger, Foster, Vinokur, & Ng, 1996; Bolger, Zuckerman, & Kessler, 2000; Lepore, Glaser, & Roberts, 2008), while others reported beneficial effects (Abraído-Lanza, 2004; Adriaansen, van Leeuwen, Visser-Meily, van den Bos, & Post, 2011; Beckner, Howard, Vella, & Mohr, 2010; Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993; Schwarzer & Gutiérrez-Doña, 2005). A recent review, however, concluded that there are indeed mixed results documented in the literature, but that the majority of studies provided evidence for the health benefits associated with social support (Nurullah, 2012). Our findings extend previous research by showing considerable day-to-day variation in the amount of received spousal support and that these fluctuations are predictive for ICPs' daily relationship-based need satisfaction and frustration. Important to note is that regardless of the received support, partners' autonomous helping motives remained important in the prediction of ICPs' daily need-based experiences.

In line with the mixed findings of received social support, our data showed that the effects of social support were indeed dependent upon the timing of the support (i.e. was the support present on those moment that it was needed most). Well-timed help was particularly important in situations where ICPs receive little support, because it could buffer for the fewer need benefits (i.e. lower need satisfaction or higher need frustration) derived from receiving little help. When ICPs receive much help, timing does not really matter as for those ICPs need satisfaction was already high (or need frustration already low). This finding is in line with the optimal matching model of support (Cutrona, 1990), and perceived responsiveness (Reis, Clark, & Holmes, 2004) in the partner, as support is there considered to be most beneficial when it is aligned with the support needs of the ICP. Timing

of help is only one aspect of skillful support (Rafaeli & Gleason, 2009). Future studies could also examine the moderating role of the support process, or how support is provided (for example, visible or (in)direct), and the equity or reciprocation of support (i.e. having opportunities to provide support in return).

Methodological Issues

A) Validity of Relationship-Based Need Satisfaction and Frustration?

In all Chapters, except Chapter 3, items for relationship-based need satisfaction and frustration were based upon the available and validated Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSFS; Chen et al., 2015). In yet another study (Vanhee, Lemmens, & Verhofstadt, 2016), this scale was adapted and validated in the relational context in a sample of 141 Belgian males and 231 Belgian females. The 24 items were scored on a 5-point Likert scale ranging from 1 (completely untrue) to 5 (completely true). These subscales showed moderate to good reliability with $\alpha = .72/.79$ for autonomy satisfaction/frustration, $\alpha = .61/.78$ for competence need satisfaction/frustration, and $\alpha = .89/.76$ for relatedness satisfaction/frustration. We used the same questionnaire in our longitudinal study (Chapter 5); however, for our diary studies (reported in Chapter 4 & 6) we made some changes to adapt it for use in a diary design. These changes were fairly minimal and not content-based. Notably, other diary studies (van der Kaap-Deeder, Vansteenkiste, Soenens, & Mabbe, 2017) provided evidence for the validity of the need satisfaction/frustration measure adapted to a diary context. Chapters 4 & 6 were the first to use these relationship-based need satisfaction/frustration items in a daily context. To underscore the validity of the adapted diary items, we performed a series of additional analyses. Exploratory factor analyses on the need satisfaction and need frustration items, thereby using a promax rotation, demonstrated that two factors needed to be retained, which explained more than 65% of the variance in both partner and ICP responses and clearly resembled a need

satisfaction and need frustration factor, with factor loadings that were moderate to good (see Table 1).

Table 1. Factor loadings after principal component analysis (PCA) with promax rotation.

	NS	NF	NS	NF
Partner data	Partner data		ICP data	
Item 1 (CS) "…, I was confident that I could do things right"	.78		.55	
Item 2 (RS) "…, I felt that (s)he cared about me"	.85		.98	
Item 3 (AS) "…, I could freely take decisions"	.65		.58	
Item 4 (RF) "…, I felt my partner was detached"		.42		.33
Item 5 (CF) "…, I felt like a failure by the mistakes I made"		.74		.63
Item 6 (AF) "…, I felt pressured to do things I wouldn't do myself"		.75		.72
Eigenvalue	3.09	1.02	2.85	1.06
Explained variance	68.40%		65.18%	

Note. S=satisfaction, F=frustration, A=autonomy, C=competence, R=relatedness, N=need

Second, we inspected the correlations between the aggregated diary scores for partner/ICP need satisfaction and frustration (based on data of Chapter 4) and the subscales of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) adapted for use within intimate relationships (see also Vanhee, Lemmens, Stas, Loeys, & Verhofstadt, 2016; Vanhee, Lemmens, & Verhofstadt, 2016). If the daily items are valid, they should correlate in meaningful ways. As can be noticed (see Table 2) all correlations were significantly positive.

Table 2. Pearson correlations between aggregated diary scores and questionnaire data of relationship-based needs for partner and ICP data

	# items		Informant	
Scales	Aggregated diary score	Baseline questionnaire	Partner (*N*=70)	ICP (*N*=70)
Need satisfaction	3 items	12 items	.66**	.60**
Need frustration	3 items	12 items	.62**	.42**
Subscale autonomy	2 items	8 items	.58**	.30*
Subscale competence	2 items	8 items	.64**	.51**
Subscale relatedness	2 items	8 items	.66**	.72**

B) <u>What about reverse effects?</u>

Although not systematically addressed in our chapters, the possibility of having reverse effects is also present within Aim 3. More specifically, a bidirectional relationship between partner and ICP outcomes and partners' and ICPs' relationship-based need satisfaction and frustration could be present. In our longitudinal study (Chapter 5), ICPs' relationship-based needs were not predictive for increases or decreases in ICPs' wellbeing and psychological distress three months later. Only disability predicted a decrease in ICPs' need satisfaction over time. Exploratory analyses on the longitudinal data collected in partners (see also p.294-295), which are not reported in this dissertation, show a similar pattern of results. It is mainly partners' relationship-based need satisfaction and frustration, that was predictive for a change in a diverse set of partner outcomes. In the opposite direction (i.e. partner outcomes predicting partners' need satisfaction or frustration), less significant results emerged.

Furthermore, also a bidirectional relationship may be present between partners' helping motivation and received social support in ICPs. In the

study of Weinstein & Ryan (2010), it was shown that experimentally induced autonomous helping motivation resulted in higher levels of help, however, received help was not measured in this study. Hence, it may be that when ICPs notice their partners' support (or support attempts), that they – because they are more aware of it – express more gratitude for the received help, which may enhance partners' autonomous helping motives. Such bidirectional associations could be further examined by longitudinal and experimental designs.

Future Directions

The role of different support types. Based on the diary study reported in Chapter 6, one interesting suggestion for future research could be to differentiate more between the different subtypes of partner support (i.e. instrumental, emotional and informational). Unfortunately we only had a very limited measure of received social support (in terms of the amount of items), which would not be a very valid way of capturing these different forms of support. Future studies could measure these support types more extensively and maybe allow us to explain the remaining direct contribution of autonomous helping motivation by using them as separate mediators. Also longitudinal studies would be beneficial to investigate potential bidirectional relationships between types of social support and, one the one hand partners' helping motivation, and one the other hand ICPs' need-based experiences.

The role of three separate needs. In this dissertation we did not have specific hypotheses regarding the differential role of autonomy, competence and relatedness need satisfaction and frustration in predicting partner and ICP outcomes. Partners who are autonomously motivated probably build a sense of effectiveness (i.e. competence satisfaction) in being more open for different helping strategies. As helping is an inherently interpersonal experience, partners are able to build intimacy with their partner in pain (i.e. relatedness satisfaction). And by being autonomously motivated partners probably experience a sense of self-initiation and volition in their helping

behaviour (i.e. autonomy satisfaction). The diary study of Weinstein & Ryan (2010) confirmed that all three needs mediated the relation between daily autonomous helping motivation and subjective wellbeing in university students. With regard to ICP outcomes, we could have expected that relatedness is the most important need of the three based upon the findings of Weinstein & Ryan (2010). However, they only measured relatedness satisfaction in help recipients, so comparisons with autonomy and competence were not possible. They found that recipients of autonomous help perceived helpers as more effortful and that they also felt closer to the helper than did recipients of controlled help, which explained the wellbeing benefits of autonomous helping motivation. We would expect that if partners are autonomously motivated they are more open and responsive to the opportunities to nurture all needs of the ICP by, for example, following the rhythm of the ICP (i.e. autonomy satisfying) and trusting the ICP when s/he gives certain directions or suggestions (i.e. competence satisfying). Within SDT, each specific need within the context of intimate relationships is given an equal value (La Guardia & Patrick, 2008). However, in more recent studies with healthy couples the need for relatedness was generally found to be the most important correlate of different relational outcomes (as for example relationship satisfaction and conflict frequencies), whereas each of the three needs played a more or less equal role in predicting individual outcomes (Vanhee, 2017). Additional analyses could be performed on the data collected in this dissertation to examine whether similar conclusions could be made for chronic pain couples.

Person-oriented methods. However, besides the conceptual reasons, we also had methodological reasons to not systematically examine the unique role of the three separate needs for autonomy, competence and relatedness. High correlations between the three needs can give problems of multicollinearity when examining their unique contributions. A possible solution could be to use more person-oriented analyses and see whether

different profiles can be distinguished by using cluster analyses. Maybe some couples differ in the extent to which one or more needs are frustrated. The findings of Vanhee and colleagues (2017) suggest that it would be interesting to reconsider the importance of each need depending on which context and outcome is taken into account. Also with regard to the direction of our motivation effects and the conclusion that probably a bidirectional relationship between motivation and needs exist, studies would benefit from using more person-oriented methods for analyses by for example taking into account within-couples variability. For longitudinal studies random intercepts cross-lagged panel models are a potential alternative for the standard cross-lagged models (Hamaker, Kuiper, & Grasman, 2015). This analytical technique takes into account trait-like, time-invariant stability through the inclusion of a random intercept, which partials out between-person variance such that the lagged relationships actually pertain to within-person (or within-dyad) dynamics. Unfortunately, our sample sizes were too small to make this technique work as for every couple a separate intercept needed to be estimated, which resulted in models that could not be estimated or models with unacceptable fit indices.

Reflections on Antecedents of Helping Motivation (Aim 4)

Antecedents of Partners' Helping Motivation

In a final set of studies we showed that daily perceived (and expressed) gratitude was predictive for partners' autonomous helping motives the same and the next day. Furthermore, two studies provided evidence for the motivation-threatening effects of goal conflict. The experience of goal conflict related to less autonomous, relative to controlled, helping motives from day-to-day. Causal effects of goal conflict were only present for ICP-reported perceived autonomous helping motivation and not for partner-reported helping motivation, which is not what we would expect based on the other study results.

With regard to gratitude, the results are in line with studies investigating the impact of gratitude upon other relational outcomes. For instance, when you receive gratitude from your partner, studies show that you feel closer and more satisfied with your relationship (Algoe, Gable, & Maisel, 2010), that you are more responsive to your partners' needs, more committed to your relationship (Gordon, Impett, Kogan, Oveis, & Keltner, 2012), that you try better to resolve conflicts (Kubacka, Finkenauer, Rusbult, & Keijsers, 2011) and feel less uncomfortable in discussing relational concerns (Lambert & Fincham, 2011). The question remained whether expressed gratitude would affect the help provider and hence, whether partners are able to "read" the gratefulness of their partner. Our study results are in line with a recent observational study showing that gratitude expression was positively related with positive emotions in the benefactor (Algoe, Kurtz, & Hilaire, 2016), in a sense that expressed gratitude is related with perceived gratitude and other positive outcomes for the person receiving gratitude. One may argue that for couples with a long-lasting relationship and certain communicational habits, gratitude would have a minimal or even paradoxical effect. Partners who receive a lot of gratitude, could feel guilty that they do not do more for their partner with pain. Probably, if the gratitude is expressed heartfelt, no indebtedness feelings may head up in partners. This is indeed what our data showed, gratitude enhances autonomous (and not controlled or introjected) helping motives.

Different from gratitude, goal conflict concerned partners' own functioning. The findings of Chapter 7 confirmed our hypothesis, showing that day-to-day variation in experienced goal conflicts was negatively associated with partners' autonomous helping motivation. This finding was also in line with additional analyses[8] performed on the longitudinal data

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[8] In our longitudinal study (reported in Chapter 5), partners also completed three times a questionnaire assessing goal conflict (similar to how goal conflict was measured in Chapter 7) spread across 6 months. These data showed that goal conflict in partners related to a decrease in autonomous helping motivation ($\chi^2(2)=1.09$, RMSEA=.00, CFI=1.00, SRMR=.01) from time 1 to time 2 ($\beta =-.20$,

collected in partners (which were not reported in this dissertation). When partners feel conflicted about helping, it probably motivates them to give priority to other goals instead of providing any help, which makes helping feel like a daunting duty and eliciting controlled helping motives. The experience of goal conflict can be one manifestations of someone's impoverished integrated functioning, meaning that their helping task is not fully integrated within other life values and goals partners may have. SDT further makes a difference between self-chosen and assigned identities. Becoming a partner of a patient with chronic pain and receiving the daily "burden" of being the primary caregiver, is an example of an assigned identity, for which no one has initially chosen (Vansteenkiste & Soenens, 2015). For this assigned identity a process of increasing reconciliation is often observed. In the beginning, the task as caregiver can be undesirable and elicit feelings of sadness and helplessness. However, there is room for change to accept this assigned and initially unwanted identity, or even see this new role as an enrichment. A controlled motivation is related with being less able to accept negative identities in an attempt to distance from the undesirable parts of themselves (Weinstein, Deci, & Ryan, 2011).

The findings of our experimental study (Chapter 8) only partially replicated these findings, as only ICP-reported perceived helping motivation of partners was affected by induced goal conflict. Chapter 8 further extended our research question by simultaneously investigating the effect of goal conflict on intrapersonal outcomes. In line with previous work, goal conflict indeed showed adverse effects on partners' subjective wellbeing (Gere & Schimmack, 2013; Riediger & Freund, 2004; Righetti, Gere, Hofmann,

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$p<.001$) and from time 2 to time 3 ($\beta =-.15$, $p<.05$), each time three months later, and to an increase in controlled helping motivation ($\chi^2(2)=2.34$, RMSEA=.04, CFI=1.00, SRMR=.01) from time 1 to time 2 ($\beta =.19$, $p<.01$), again three months later. In the opposite direction, goal conflict predicted a decrease in partners' autonomous helping motivation ($\beta =-.10$, $p<.10$) and an increase in partners' controlled helping motivation ($\beta =.11$, $p<.10$) from time 2 to time 3. The latter two effects were only marginally significant, so maybe the relationship between goal conflict and helping motivation is bidirectional, however, the results in the hypothesized direction are stronger.

Visserman, & Van Lange, 2016). One recent study showed that encountering situations of goal conflict with one's partner resulted not only in higher levels of daily negative affect and stress, but that it also impacted daily relationship satisfaction (Righetti et al., 2016). In addition, our results showed that, when partners experience a goal conflict, also the quality of the interaction with the ICPs is affected. Partners displayed more need supportive and less need thwarting[9] helping behaviours toward the ICP. This finding is in line with a recent theoretical model (i.e. the affective-motivational model of interpersonal dynamics in pain) stating that when individuals are focused upon self-oriented goals (for example, giving priority to the puzzle task and perform well), they are less sensitive to the needs of the person in pain (Vervoort & Trost, 2017). In order words, it impedes their receptivity and attention for the person in pain, contributing to rigid and potentially maladaptive helping responses.

Some final remarks need to be made about the concept of goal conflict. Based on our experience and anecdotic stories by visiting couples at home and the comments they gave in their diaries, we thought that there would be substantial variation in the extent to which helping conflicted with other activities from day-to-day, and indeed the variance situated at the daily level was 42.69%. However, when looking at the distribution of goal conflict in terms of its frequency, in 46% of the recorded days no goal conflicts were reported. Maybe this was due to the fact that the items included no self-selected or personal goals, as for example in other studies (Casier et al., 2013), and hence, that some of the goals (e.g., work-related goals) were not always perceived as applicable for some of the partners. And finally, different types of goal conflicts exist. Competing goals can be approach-approach goals (i.e. two appealing goals that interfere) or avoidance-avoidance goals (i.e. having to choose between two undesirable options) or a combination of those two, for example approach-avoidance goals (i.e. one

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[9] Need thwarting helping behaviour was not reported in Chapter 8 for reasons of clarity and conciseness.

goal or event that has both positive and negative effects or characteristics that make the goal appealing and unappealing simultaneously) (Claes, Crombez, & Vlaeyen, 2015; Claes, Karos, Meulders, Crombez, & Vlaeyen, 2014). Tasks that individuals want to avoid are easier to disengage from and make it easier to switch to another goal, while the opposite is observed for approach goals. Future research could make a distinction between these type of goals and, consequently, types of goal conflict to see whether it affects our outcomes in a different way.

Future Directions

Causal effects of gratitude. This dissertation included only one study with gratitude as antecedent of partners' helping motivation, which was correlational in nature (Chapter 7). This study showed promising results as perceived daily gratitude could predict partners' helping motivation both the same and the next day, while no reversed lagged effects[10] were present. Future studies could try to investigate the causal effects of expressed gratitude, by manipulating gratitude expression in an experimental study with couples recruited from the general population. Participants could then be randomly assigned to the help recipient role or helper role (Caes et al., 2012). As these couples have no pain complaints, pain has to be induced by for example using a cold pressor task (i.e. putting your arm in a box filled with painful cold water), frequently used in previous studies (Caes, Vervoort, Eccleston, Vandenhende, & Goubert, 2011; Van Damme,

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[10] In additional analyses we checked for the potential reciprocal role of gratitude and goal conflict on helpers' motivation, each time controlling for the corresponding measure the day before. Two sets of analyses were conducted, one involving relative autonomous helping motivation as a same-day predictor and one involving relative autonomous helping motivation as a lagged predictor. With respect to the same-day associations, helping motivation predicted changes in partners' perceived gratitude and ICPs' expressed gratitude, while no effect on changes in goal conflict emerged. With regard to lagged effects of partners' helping motivation, there were no significant results found. Taking together, there is only a reverse effect present for helping motivation influencing gratitude, but only if we look at same-day associations, as there were no significant lagged effects. Hence, the results in the hypothesized direction are more convincing.

Crombez, & Eccleston, 2008; Vervoort et al., 2011). Partners (or the "helpers") would be allowed to provide help and could receive some extra instructions how they can reduce the pain during this painful task (as for example, using distraction or humor (Blount et al., 1997). In a subsequent interview with both partners' gratitude expression could be elicited in half of the help recipients (i.e. gratitude condition) by asking questions such as "Thinking about the task you just did, what were you most grateful about in having your partner here with you during the task?". In the other half of the dyads (i.e. control condition), the interview would only consist of questions not related to pain or partner (= control condition). After this interview, the pain tasks could be performed a second time while videotaping the couples. Using a video-review procedure, we could let the participants (separately) report on the type of help provided or received, and the (perceived) type of partners' helping motivation. In the gratitude condition we would expect more autonomous helping motives during the second pain tasks compared with the control condition.

Other antecedents. We are aware of the fact that we only examined two of many possible other factors that could influence helping motivation. For example partners' daily levels of tiredness or stress could also lead partners to feel that helping is a "job to do". Or at a more personal or dyadic – instead of daily – level, beliefs about the source of the ICPs' pain or relational dissatisfaction may also affect partners' helping motives. However, the rationale for choosing these two variables was because they formed a balanced pair, both in terms of the primary target (i.e. partner him/herself or patient) and its valence (i.e. the one factor may considered a protective/motivation-promoting factor and the other a risk/motivation-threatening factor). Specifically, while goal conflict concerns the partner's personal experience and represents a risk factor, gratitude is more reflective of the interpersonal dynamics between patients and partners and constitutes a motivation-promoting factor. Of course, we could have chosen other

motivation-promoting factors, such as the level of patients' positive emotions but gratitude is more specific and more reflective of the interpersonal dynamic. Second, given our central focus on the day-to-day level, we were eager to select predictors with sufficient day-to-day variation. Based on our experience and anecdotic stories of partners, we thought that there would be substantial variation in the extent to which helping conflicts with other activities from day-to-day and also in the level of expressed and perceived gratitude by the partner from day-to-day. Supportive of such anecdotic evidence is past work, which suggested that both gratitude (Gordon, Arnette, & Smith, 2011) and goal conflict (Casier et al., 2013; Righetti et al., 2016) are suitable predictors at the daily level. Perhaps some other predictors (e.g., source of the pain) may be more interpersonally stable, making these factors less well suited for diary studies. Of course, it is well possible that, for instance, daily stress may explain why goal conflict negatively relates to autonomous motivation (Righetti et al., 2016).

CLINICAL IMPLICATIONS

The results of this dissertation have some important clinical implications. Most individuals do not get chronic pain in isolation or cope alone. For those involved in a romantic relationship, partners are the primary coping resource (Manne & Badr, 2008). Romantic partners are especially impactful in a person's life. They often take an active role in medical decisions and may persuade the other partner to adhere to medical treatment, leading to faster recovery (Stephens et al., 2009). Several studies already demonstrated the benefits of partner involvement in pain treatment (Cano & Leonard, 2006; Martire et al., 2010). The following questions could inspire clinicians in their work with individuals with chronic pain (ICPs) and their partners.

#1 Are partners motivated to provide help?

The reason for partners to be involved in pain treatment is of critical importance. That is, although some partners might be highly motivated, their motivation may be of rather poor quality, that is, being controlled rather than autonomous in nature. The present data indicate that when partners experience their helping role as a burden, it signals an underlying pressuring motivation to support the ICP. Partners' helping motives are important to take into account as findings showed that helping motivation related to diverse individual and relational outcomes in partners. Probably this relationship is bidirectional, meaning that when partners are distressed, they have limited resources to provide help, compared with when they feel well, they probably have more energy and feel more able to provide help. Partners should also take care of themselves, and not only take care of the ICP. Furthermore, the helping motives of the partner are also (indirectly) related to variations in ICPs' wellbeing and distress from day-to-day and across time. So for both the partner as the ICP it may be relevant to assess the underlying reasons for providing help. Autonomously motivated partners might be less rigid and more flexible in prioritizing ICPs' need above their own needs and may be more receptive for feedback of the ICP in the caregiving process (Vervoort & Trost, 2017). An autonomous helping motivation may prevent partners from becoming overprotective (Hagedoorn et al., 2006; Hagedoorn et al., 2000) or solicitous (Cunningham et al., 2012; Raichle, Romano, & Jensen, 2011) and thereby buffer against thwarting ICPs' need for autonomy (e.g., receiving unwanted/unnecessary help), competence (e.g., feeling incapable of taking care for oneself) and relatedness (e.g., cold interaction or feeling distance).

#2 How can partners provide beneficial help?

Helping responses are considered supportive or helpful depending upon the extent to which these responses meet the needs of the person in pain (Deci & Ryan, 2000; Rafaeli & Gleason, 2009). Self Determination

Theory (SDT) defines a set of basic psychological needs that are considered essential for one's wellbeing, i.e. the need for autonomy (i.e. volitionally engage in activities), competence (i.e. feeling self-efficacious) and relatedness (i.e. feeling close with others), and that can be satisfied (or not) during caregiving interactions. The findings in this dissertation systematically showed that when partners or ICPs experience need satisfaction within their relationship, compared with need frustration, they report better individual wellbeing, less distress and higher relationship satisfaction.

These results reveal that it is important to provide a need-supportive environment to ICPs. There should be opportunities for ICPs to feel close with others and to have a feeling of being autonomous and competent in pursued activities, regardless of the levels of disability and pain intensity ICPs have. Partners can be more or less need supportive toward the ICP, that is, they can be more or less controlling (vs autonomy supportive), more or less cold or rejecting (vs relationally supportive), or more or less critical or negative (vs competence supportive) (Weinstein, 2014).

Our results identified ICP's disability as a risk factor for both diminishing partners' autonomous helping motivation and ICP's need satisfaction over time. It is important to keep doing studies about the psychosocial risk factors of disability and identify tools for their identification, in order to avoid the detrimental effects on ICPs' needs and partners' helping motives.

Our findings highlight that frustration of relational needs matters in intimate relationships as it predicts how dissatisfied partners will be with their relationship. In general, in order to lessen relationship conflict and relationship dissatisfaction - the main reasons why couples seek therapy - couple therapists should recognize and tackle relational need frustration. Couple therapists could explore partners' cold and rejecting behaviour (i.e. the inducers of relatedness frustration) and then should also pay attention to any extremely controlling behaviours expressed by their clients (i.e. inducers

of autonomy frustration) and partners' vague and unreasonable expectations (i.e. inducers of competence frustration), as frustration of these needs have also proved to play a role in intimate relationships for both genders (Vanhee, 2017).

#3 But what if partners have no time?

In situations where partners feel pressured to provide help, it is important that the support is present on those moments that it is most needed as it can buffer against the costs (i.e. in terms need satisfaction and frustration) of low support provision. For this, it seems crucial that partners are aware of the stressors ICPs experience and the consequent support needs that may arise from it. Also ICPs may benefit from learning to communicate their support needs towards their partner, which may be an important target point for clinical practice.

#4 What can ICPs do in return?

Our findings showed that also partners benefit from having their needs met within the context of their relationship, which implies that the helping process is bidirectional. Indeed, other researchers also point to the importance of reciprocity of support in couples with chronic pain (Rafaeli & Gleason, 2009; Weinstein, 2014). This mutuality of support is also covered by different models of dyadic coping, which refers to the different ways in which couples interact and manage their illness-related stressors (Badr & Acitelli, 2017). If we want to protect partners of ICPs against a "helping burnout," we should also pay attention to the role of ICPs in supporting need satisfaction in partners and eliciting particular motives for help. For instance, guilt-inducing statements may awaken more pressured forms of help and engender greater need frustration, with resulting negative consequences for the partner.

Furthermore, enhancing the expression of gratitude towards partners may be an important target point for intervention in ICPs. Our results

specifically suggest that couples may benefit from expressing more gratitude, but also from learning to pay attention and to make positive attributions when spouses express gratitude to them (see also Gordon et al., 2011). It might be the case that the same processes are present in other relationships, as for example formal caregivers and patients, but further research is needed to investigate this.

#5 Why is it important to discuss conflicting goals?

Based on our findings, it seems important that both partners and ICPs are aware of goal conflicts and communicate about them for two reasons. First, partners are often pressured to divide their time and energy across different sets of activities and goals (Riediger & Freund, 2004). Providing support to your partner in pain is only one goal within a hierarchy of other goals a partner may have, for example investing time in work, education or family. This may cause partners to experience their helping task as a daunting duty, which may elicit more controlled motives for helping. It seems useful to address partners' experience of goal conflicts in clinical practice, as these may constitute a source of relational conflicts (Gere & Schimmack, 2013).

Second, our results also showed that the experience of goal conflict in partners affects not only partners' personal functioning, but also the amount and quality of helping interactions. Having conflicting goals is of course inevitable (Riediger & Freund, 2004), but both partners and ICPs should be aware of the potential detrimental impact on their couple functioning. If ICPs are in need of help, it may be important to clearly communicate these needs to the partner and take into account that their partner could have other valued goals at that moment. A pitfall for ICPs could be to rely more on indirect methods of communicating pain, instead of more direct and verbal disclosures. Indirect forms of support seeking may be aversive for potential support providers (Barbee, Rowatt, & Cunningham, 1998; Williams & Mickelson, 2008), who react with unsupportive or rejecting behaviours.

#6 What if both partners have chronic pain?

Our findings showed that there was no difference in relative autonomous helping motivation of partners with, compared with those without chronic pain. Since we did not find a significant difference in their helping motivation, we decided to not further control for the presence or absence of pain in partners in our studies. However, to some extent we checked whether the presence of chronic pain in partners related to different outcomes. Specifically, we considered both potential main effects and the moderating role of couple-membership; that is, we analysed whether the obtained findings would apply to both types of couples or only to one specific type. Because of this lack in systematic effects, we concluded that there is no difference in the consequences of partners' helping motives for partner and ICP outcomes. So, in short, for both types of couples, helping motivation remains important to take into account.

GENERAL CONCLUSION

The present dissertation was the first to systematically examine the association between partners' helping motivation and diverse partner and ICP outcomes. In six empirical chapters, the present findings demonstrated an (indirect) relationship between partners' helping motives and self-reported indicators of individual and relational wellbeing at both the between- and within-person level in partners and ICPs. In addition, the present findings yielded evidence for the critical explanatory role of relationship-based need satisfaction and frustration in the observed relationships between partners' helping motives and partner and ICP outcomes. The amount of received partner support could further explain why partners' helping motives related to ICPs' need-based experiences from day-to-day. Reversed analyses, together with longitudinal data, further made clear that the relationship between partners' helping motives and partners' wellbeing is probably bidirectional in nature, while for ICPs there was less

evidence for these reversed relationships. Finally, the findings also indicated that gratitude for provided help may be a protective factor and motivation-promoting, while experienced goal conflict by the helping partner may rather be a risk factor for diminishing the quality of motivation, but may also be a threat for the quality and quantity of partners' helping behaviours. Overall, these findings imply that pain treatment programs should include partners, as their helping behaviour is crucial for couples' relationship quality and may potentially help to alter how both partners feel.

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NEDERLANDSTALIGE SAMENVATTING

ANTECEDENTEN EN GEVOLGEN VAN HET HELPGEDRAG VAN PARTNERS IN EEN CONTEXT VAN PIJN: EEN MOTIVATIONELE BENADERING

ALGEMENE INLEIDING

Aan chronische pijn zijn voor de patiënt veel persoonlijke, sociale en functionele beperkingen gerelateerd. Samenwonen met een patiënt die chronische pijnklachten heeft, stelt ook de partner voor extra uitdagingen. Partners krijgen namelijk een aantal nieuwe verantwoordelijkheden en zorgtaken toebedeeld waarvoor zij initieel nooit gekozen hebben. Het bieden van dagelijkse zorg kan heel intensief zijn en soms als fysiek en emotioneel uitputtend ervaren worden door de partner. Daarnaast komt ook het relationeel functioneren vaak onder druk te staan. Het helpgedrag van de partner heeft op zijn beurt terug een impact op het welbevinden van de patiënt. Pijn bestaat dus niet in een sociaal vacuüm. Dit doctoraat focust op dit proces en formuleert mogelijke verklaringsmodellen.

Pijn: definitie, prevalentie, impact

Pijn is universeel aanwezig: het komt voor in alle populaties en leeftijdsgroepen (Croft, Blyth, & Van Der Windt, 2011). Wanneer pijn langer dan drie maanden aanhoudt, wordt deze als chronisch beschouwd (Merskey & Bogduk, 1994). Prevalentiecijfers tonen aan dat chronische pijn voorkomt in een op vijf volwassenen (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). Op het persoonlijk vlak wordt naast de pijnsymptomen ook substantiële hinder in het dagelijks leven ervaren. Pijn gaat vaak gepaard met angst en depressieve symptomen (Beesdo et al., 2010) en beperkingen in het werkleven (Breivik et al., 2006). Op interpersoonlijk vlak heeft chronische pijn ook een niet te onderschatten impact. Partners van patiënten met chronisch pijn rapporteren meer verhoogde stress, relationele ontevredenheid en emotionele en fysieke uitputting (Geisser, Cano, & Leonard, 2005; Jones, Hadjistavropoulos, Janzen, & Hadjistavropoulos, 2011; Leonard & Cano, 2006) en meer depressieve symptomen (e.g., Ahern & Hendryx, 2008). Op maatschappelijk vlak, ten slotte, is er een grote

directe (bv. gezondheidszorg) en indirecte (bv. absenteïsme, invaliditeitsuitkering, …) kost (Dagenais, Caro, & Haldeman, 2008; Manchikanti et al., 2009).

Chronische pijn als sociaal gegeven

De nieuwe definitie van pijn (Williams & Craig, 2016) omvat nu ook een sociale component. De nadruk op het interpersoonlijke vinden we verder terug in verschillende theoretische modellen. Het communicatiemodel (Hadjistavropoulos et al., 2011) maakt duidelijk dat wanneer een pijnstimulus geuit wordt, de interpretatie (bv. over- of onderschatten van iemands pijnintensiteit) en reactie (bv. hulp bieden of weglopen) van de observator de pijnervaring van de persoon met pijn kan beïnvloeden. Het empathiemodel (Goubert et al., 2005) biedt een kader om de reacties van anderen, wanneer deze geconfronteerd worden met iemand die pijn heeft, beter te begrijpen. Het maakt bijvoorbeeld een onderscheid tussen top-down (i.e. factoren gerelateerd aan de observator), bottom-up (i.e. factoren gerelateerd aan de persoon met pijn) en contextuele factoren (i.e. de relatie tussen de observator en de persoon met pijn).

De rol van de partner

Het bieden van hulp als partner aan een patiënt met chronische pijn wordt vaak als vanzelfsprekend beschouwd (Collins, Ford, Guichard, Kane, & Feeney, 2010). Het krijgen van hulp is echter niet altijd behulpzaam. Het ontvangen van hulp door de partner geeft gemengde resultaten naar het welbevinden van de patiënt (Mcclure et al., 2014). Verklaringen voor deze negatieve effecten (of het uitblijven van positieve effecten) van hulp hebben mogelijks te maken met de manier waarop deze hulp wordt gegeven door de partner. Zo kan de manier van helpen bepalen of patiënten zich incompetent voelen, het gevoel hebben bij iemand in het krijt te staan of de aandacht op het probleem vergroten door de gekregen hulp (Rafaeli & Gleason, 2009).

Er zijn verschillende theoretische modellen naar voor geschoven die het helpgedrag van partners proberen categoriseren om de (positieve of negatieve) impact op de patiënt beter te begrijpen. In de pijnliteratuur heeft het operante (of gedragsmatige) kader, zoals gebruikt door Fordyce (1976), een zeer belangrijke rol gespeeld. Er wordt een onderscheid gemaakt tussen gedragingen die pijngedrag bekrachtigen (bv. aandacht geven, taken overnemen) of eerder ontmoedigen (bv. pijnexpressie negeren of geïrriteerd reageren). Wanneer pijngedrag wordt bekrachtigd, zal het in frequentie toenemen, wat niet gunstig is voor het genezingsproces en de hinder bij de patiënt. Integendeel, volgens het intimiteitsprocesmodel kunnen empathische en bezorgde partners ook positieve effecten met zich meebrengen, zoals het versterken van de intimiteit en verbondenheid tussen partners (Cano & Williams, 2010). De sociale steun literatuur maakt een onderscheid tussen verschillende types hulp (bv. instrumentele, informationele of emotionele steun). Hierbij wordt het belang benadrukt van de mate waarin de gegeven hulp overeenstemt met de behoeftes van de persoon die de hulp ontvangt (Rafaeli & Gleason, 2009). Het is tot nu toe nog onduidelijk welke behoeftes bij patiënten een rol spelen.

Theoretisch kader: de Zelf-Determinatie Theorie

Volgens de Zelf-Determinatie Theorie (ZDT; Ryan & Deci, 2017) heeft elk individu drie psychologische basisbehoeftes die essentieel zijn voor persoonlijke groei en welbevinden. Deze basisbehoeftes zijn autonomie (ervaren van psychologische vrijheid), competentie (zich bekwaam voelen) en verbondenheid (ervaren van warme en hechte relaties). Partners kunnen elkaars psychologische behoeftes helpen ondersteunen (i.e. relationele behoeftesatisfactie) of net actief dwarsbomen (i.e. relationele behoeftefrustratie). In de koppelliteratuur wordt vaak de nadruk gelegd op de behoefte aan intimiteit of verbondenheid. ZDT stelt dat ook behoeftes aan autonomie en competentie binnen een relationele context, cruciaal zijn voor

ons interpersoonlijk functioneren (Patrick, Knee, Canevello, & Lonsbary, 2007).

De theorie onderscheidt verder ook verschillende types motivatie om gedrag te stellen en biedt dus ook een kader om helpmotivatie bij partners van patiënten met chronische pijn in kaart te brengen. Er wordt een onderscheid tussen autonome motivatie (hulp bieden omdat dit plezier geeft of in lijn ligt met bepaalde eigen doelen en waarden) en gecontroleerde motivatie (hulp bieden om tegemoet te komen aan externe verwachtingen of om negatieve gevoelens zoals schuld te vermijden). Deze theorie vormde de basis voor het opstellen van de onderzoeksvragen binnen dit doctoraat.

DOELSTELLINGEN

Uit bovenstaand literatuuronderzoek bleek dat partners en patiënten met chronische pijn een wederzijdse invloed op elkaar uitoefenen. Ten eerste blijft het nog onduidelijk welke factoren ervoor zorgen dat het welbevinden en relationeel functioneren van partners onder druk staat. Ten tweede is het nog onduidelijk hoe partners, via hun helpgedrag, een positieve impact kunnen uitoefenen op de patiënt.

Dit doctoraatsonderzoek had vier hoofddoelstellingen. Ten **eerste** beoogde het onderzoek na te gaan of de helpmotivatie van partners gerelateerd was aan het individueel en relationeel welzijn van de partner zelf. Hierbij werd verwacht dat wanneer partners een hogere autonome motivatie hadden om hulp te bieden, in vergelijking met een gecontroleerde motivatie, partners een hoger welzijn en een betere relatiekwaliteit zouden rapporteren. In de **tweede** doelstelling werd onderzocht of de helpmotivatie van de partner ook gerelateerd was aan het welbevinden en relationeel functioneren bij de patiënt. Er werd verwacht dat autonome helpmotieven betere uitkomsten bij patiënten zouden genereren in vergelijking met gecontroleerde helpmotieven. In een **derde** doelstelling werd onderzocht

welke processen de verbanden tussen helpmotivatie bij partners en welzijnsuitkomsten bij partners en patiënten konden verklaren. Hierbij werd als verklarend mechanisme uitgegaan van de satisfactie of frustratie van de drie psychologische basisbehoeftes, zoals vooropgesteld in ZDT (Deci & Ryan, 2000; Ryan & Deci, 2017). Een **vierde** en laatste doelstelling focuste op mogelijke antecedenten of voorspellers van de helpmotivatie van partners. Twee variabelen werden bestudeerd, namelijk dankbaarheid bij patiënten en doelconflict bij partners. We hadden de verwachting dat wanneer patiënten meer dankbaarheid uiten naar hun partner, partners meer autonoom gemotiveerd zouden zijn om hulp te bieden. Daarnaast hadden we de verwachting dat doelconflict bij partners autonome helpmotivatie vermindert en eerder leidt tot gecontroleerde motivatie.

RESULTATEN

Doelstelling 1

In hoofdstuk 3 en 4 werd de eerste doelstelling onderzocht. In een eerste cross-sectionele vragenlijststudie (**Hoofdstuk 3**; *N*=48) werd gevonden dat een autonome, ten opzichte van een gecontroleerde, motivatie om hulp te bieden bij partners gerelateerd was aan een beter individueel welzijn, minder distress en een hogere relatiekwaliteit bij partners. De resultaten waren dus in lijn met onze verwachtingen. In de daaropvolgende dagboekstudie (**Hoofdstuk 4**; *N*=70) verlegden we de focus van verschillen tussen, naar verschillen binnen partners. Partners werden namelijk gevraagd om 14 dagen na elkaar een dagboek bij te houden waarbij ze elke avond terugblikten op hun voorbije dag. Hierbij rapporteerden partners over hun helpmotieven gedurende die dag, alsook over bepaalde andere variabelen gerelateerd aan hun dagelijks welbevinden. Uit deze studie bleek dat er binnen een individu ook fluctuaties zijn in helpmotieven van dag tot dag. Deze variatie in helpmotivatie was predictief voor de veranderingen in hoe partners zich voelden van dag tot dag. Wanneer partners een hogere

autonome helpmotivatie rapporteerden, ging dit gepaard met een stijging in positief affect en een vermindering in negatief affect, relationeel conflict en gevoelens van uitputting omwille van het helpen.

Doelstelling 2

De tweede doelstelling werd onderzocht aan de hand van drie studies. In **Hoofdstuk 3** (cross-sectionele studie; *N*=48) werden naast partners ook patiënten gevraagd vragenlijsten in te vullen over hun welbevinden en relationeel functioneren. Uit de resultaten kwamen geen directe associaties naar voor tussen de helpmotivatie van partners en welbevinden en relationeel functioneren bij patiënten. Bij het nagaan van moderatie-effecten van pijnintensiteit kwam wel naar boven dat er een verband zou zijn tussen autonome helpmotivatie van partners en een betere relatiekwaliteit bij patiënten, maar enkel voor patiënten met een hoge pijnintensiteit. Dit moderatie-effect was marginaal significant en werd verder in het doctoraat geen enkele keer meer bevestigd. In de daaropvolgende dagboekstudie (**Hoofdstuk 4**; *N*=70) werden naast partners ook patiënten gevraagd 14 dagen op rij te rapporteren over hoe zij zich voelden van dag tot dag. Uit de resultaten bleek dat, in lijn met onze verwachtingen, de dagelijkse helpmotivatie van de partner op een meestal indirecte manier (via behoeftesatisfactie en –frustratie) van belang was voor het verklaren van de fluctuaties in patiëntuitkomsten. Op dagen dat partners een hogere autonome, ten opzichte van een gecontroleerde, helpmotivatie rapporteerden, rapporteerden patiënten meer positief affect, minder negatief affect, minder relationele conflicten en hinder, een hogere hoeveelheid gekregen hulp en een hogere tevredenheid met die gekregen hulp van de partner. Ten slotte werd in een longitudinale studie (**Hoofdstuk 5**, *N*=141) nagegaan of de helpmotivatie van partners ook op langere termijn van belang is voor het welzijn van patiënten. Aan koppels werd gevraagd om op drie tijdstippen vragenlijsten in te vullen, telkens met drie maanden tussentijd. Uit deze data bleek dat een autonome helpmotivatie bij partners tot een stijging in het

welzijn van patiënten leidde, na drie maanden. Eveneens werd er een vermindering in distress bij patiënten vastgesteld, maar dit was enkel op een indirecte manier (via behoeftefrustratie). Daarnaast speelde de helpmotivatie van de partner geen predictieve rol in de hinder die patiënten ervaren omwille van hun pijn. De richting van het verband was omgekeerd, hinder bij patiënten ondermijnde de autonome helpmotivatie bij partners drie maanden later.

Doelstelling 3

De satisfactie of frustratie van de psychologische basisbehoeftes, zoals gedefinieerd door ZDT, werden gemeten op het niveau van de partnerrelatie. Dit wil zeggen dat we doorheen de studies gemeten hebben in welke mate partner en patiënt ondersteunend, dan wel ondermijnend, waren voor de bevrediging van elkaars psychologische basisbehoeftes. In **Hoofdstuk 3** (cross-sectionele studie; *N*=48) werd, zoals verwacht, gevonden dat relationele behoeftesatisfactie de verbanden tussen helpmotivatie bij partners en de diverse partneruitkomsten kon verklaren. In **Hoofdstuk 4** (dagboekstudie; *N*=70) konden de dagelijkse fluctuaties in relationele behoeftesatisfactie en –frustratie verklaren waarom er verbanden waren tussen de helpmotivatie van partners en partner- en patiëntuitkomsten. In **Hoofdstuk 5** (longitudinale studie; *N*=141) toonden de resultaten dat de autonome helpmotivatie bij partners zorgde voor een daling in de relationele behoeftefrustratie bij patiënten na drie maanden. Deze daling zorgde op zijn beurt voor een stijging in het welzijn en een daling in distress bij patiënten na opnieuw drie maanden. Net zoals bij helpmotivatie voorspelde hinder een daling in de relationele behoeftesatisfactie bij patiënten.

In **Hoofdstuk 6** (dagboekstudie, *N*=134) zijn we tenslotte nog iets dieper ingegaan op de verbanden tussen helpmotivatie bij partners en de relationele behoeftesatisfactie en -frustratie bij patiënten. De mediërende rol van gekregen steun (zoals gepercipieerd door patiënten zelf), samen met de modererende rol van timing van de hulp werd in deze studie onderzocht.

Resultaten toonden aan dat een hogere autonome motivatie van dag tot dag, tot een hogere gekregen steun leidde, wat slechts gedeeltelijk de associatie met behoeftesatisfactie en -frustratie bij patiënten kon verklaren. Daarnaast bleek dat een goede timing van hulp (i.e. hulp bieden op de momenten dat het nodig was) vooral belangrijk is wanneer weinig steun geboden wordt. Wanneer er veel steun geboden wordt, rapporteerden patiënten reeds meer behoeftesatisfactie en minder behoeftefrustratie en een goede timing van hulp was hierbij minder cruciaal.

Doelstelling 4

In **Hoofdstuk 7** werd de rol van dankbaarheid en doelconflict onderzocht als mogelijke voorspellers van helpmotivatie bij partners van dag tot dag (dagboekstudie, N=64). We vonden dat gepercipieerde dankbaarheid (i.e. de gekregen dankbaarheid voor de gegeven hulp doorheen de dag) een positief effect had op de variatie in autonome helpmotivatie bij partners dezelfde dag alsook de dag nadien. Dagelijkse variatie in doelconflict bij partners (i.e. wanneer helpen die dag het nastreven van andere doelen in de weg stond) was eveneens voorspellend voor de fluctuaties in helpmotivatie. Hoe meer doelconflict partners rapporteerden, hoe lager de autonome helpmotivatie die dag gescoord werd. In **Hoofdstuk 8** werden tenslotte via een experimentele studie (*N*=68) de causale effecten van doelconflict nagegaan. Koppels werden uitgenodigd naar de faculteit om samen een aantal huishoudelijke taken uit te voeren die op video werden opgenomen. Doelconflict bij partners werd gemanipuleerd door hen in de ene conditie een extra taak te geven (en op die manier een doelconflict te creëren), terwijl in de andere conditie (controleconditie) geen extra taak moest uitgevoerd worden. De resultaten toonden aan dat doelconflict ervoor zorgde dat partners minder positief affect ervoeren tijdens het uitvoeren van de taken en eveneens dat patiënten meer pijnintensiteit rapporteerden en meer pijngedrag gingen stellen. Daarnaast bleek doelconflict ook een impact te hebben op de kwaliteit van het helpgedrag van partners. Partners waren minder behoefte-

ondersteunend (zowel volgens zichzelf, de patiënt als de observator) en meer behoefte-ondermijnend en boden ook effectief minder hulp. Daarnaast percipieerden patiënten dat hun partner minder autonoom gemotiveerd was om hulp te bieden bij de huishoudelijke taken. Partners rapporteerden zelf geen verschil in hun helpmotivatie wanneer doelconflict aan- of afwezig was.

DISCUSSIE

Dit doctoraat heeft als eerste systematisch de Zelf-Determinatie Theorie toegepast op pijnonderzoek. In de uitgevoerde studies werden de meeste hypothesen bevestigd, waardoor het belang van een interpersoonlijke blik op pijnonderzoek opnieuw benadrukt wordt. In die zin is onderzoek naar de lijdensdruk van de partner die zorgt voor een patiënt met chronische pijn niet verwaarloosbaar. De motivatie waarmee dagelijks hulp geboden wordt door partners bleek gerelateerd te zijn aan het welbevinden van partners. Deze studies konden echter geen uitsluitsel bieden over de richting van deze verbanden. Het kan dus ook zijn dat partners die uitgeput zijn of depressieve klachten hebben, minder in staat zijn om autonoom gemotiveerde hulp te bieden.

Zoals verwacht op basis van verschillende theoretische modellen, kwam in dit doctoraatsonderzoek duidelijk de wisselwerking tussen partners en patiënten naar voor. De manier waarop partners hulp bieden (autonoom of gecontroleerd gemotiveerd; behoefte-ondersteunend of –ondermijnend) vertoonde duidelijke verbanden met het individueel en relationeel welbevinden van patiënten. Een limitatie van dit onderzoek is dat de aparte rol van autonomie, competentie en verbondenheid niet werd onderzocht. Het zou bijvoorbeeld kunnen zijn dat binnen een relatie een of twee specifieke behoeftes chronisch gefrustreerd zijn. Het verder uitspitten van dit onderscheid kan belangrijke handvaten bieden voor de klinische praktijk.

Toekomstig onderzoek kan zich verder toeleggen op de generaliseerbaarheid van deze bevindingen voor koppels die nog niet in een langdurige relatie zitten of die te maken hebben met andere chronische aandoeningen. De hoeveelheid vrouwelijke patiënten in onze studies was bovendien heel hoog, waardoor we ook niet weten of de bevindingen overeind zouden blijven voor een groep mannelijke patiënten. Voorts zijn de meeste van onze studies gebaseerd op zelf-rapportage en is verder onderzoek, via observationele studies, nodig naar het eigenlijke gedrag van partners en patiënten. Tot slot werpt dit doctoraat slechts een licht op twee mogelijke antecedenten van helpmotivatie. Andere inter- of intra-individuele factoren (bv. type pijn of dagelijkse stress bij de partner) kunnen ook predictief zijn voor de helpmotivatie van partners en dienen verder onderzocht te worden.

Dit doctoraatsonderzoek benadrukt dat bij de behandeling van pijn best niet alleen op de patiënt gefocust wordt. Het betrekken van partners in het therapieproces is cruciaal. In therapie kan men identificeren of partners belangrijke doelconflicten hebben, zodanig dat koppels hier verder over kunnen communiceren. Daarnaast kan ook in kaart gebracht worden of er sprake is van behoeftefrustratie binnen het koppel en kunnen mogelijkheden gezocht worden om zowel partners als patiënten te begeleiden in het beter ondersteunen van elkaars behoeftes.

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Sara,
September 2017

APPENDIX

DATA STORAGE FACT SHEETS

% Data Storage Fact Sheet

% Name/identifier study: When is helping your partner a burden? The relation between helping motivation and personal and relational functioning. (PhD dissertation: Chapter 3)

% Author: Sara Kindt

% Date: 23/08/17

1. Contact details

===

1a. Main researcher

- name: Sara Kindt

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If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

===

* Reference of the publication in which the datasets are reported:

Kindt, S., Vansteenkiste, M., Loeys, T., Cano, A., Lauwerier, E., Verhofstadt, L. L., & Goubert, L. (2015). When is helping your partner with chronic pain a burden? The relation between helping motivation and personal and relational functioning. *Pain Medicine*, 16(9), 1732–1744. doi:10.1111/pme.12766

* Which datasets in that publication does this sheet apply to?: all data

3. Information about the files that have been stored

===

3a. Raw data

----

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
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- [X] research group file server
- [ ] responsible ZAP PC

* Who has direct access to the raw data (i.e., without intervention of another person)?
- [X] main researcher
- [X] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

3b. Other files

----

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results.

Specify:

- see method section manuscript
- see:
  - o Flowchart data files Study 1.docx

- [X] file(s) containing processed data. Specify:

Raw data files:

- Data Lime Survey partnerdeel.sav
- Data Lime Survey patientdeel.sav
- Data Lime Survey Samengezet_aangevuld papieren VL.sav

Cleaned data files:

- Data Vragenlijststudie Cleaned.sav
- Data Vragenlijststudie Cleaned_ALL.sav

Final data files:

- Data vragenlijststudieN48.sav

- [X] file(s) containing analyses. Specify:

- Script study1 04_06_14_REVISION.R
- Simulation Study study 1 posthoc power.R

- [X] files(s) containing information about informed consent. Specify: all informed consents are available in pdf on the PC of the main researcher and the research group file server

- [ ] a file specifying legal and ethical provisions. Specify:

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- [ ] other files. Specify: ...

* On which platform are these other files stored?

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- [ ] responsible ZAP PC

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher

- [X] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction

===

* Have the results been reproduced independently?: [ ] YES / [X] NO

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- name:

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- affiliation:

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% Data Storage Fact Sheet

% Name/identifier study: Helping motivation and well-being of chronic pain couples: a daily diary study (PhD dissertation: Chapter 4)

% Author: Sara Kindt

% Date: 25/03/16

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- name: Prof. dr. Liesbet Goubert

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- e-mail: Liesbet.Goubert@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

==

* Reference of the publication in which the datasets are reported:

Kindt, S., Vansteenkiste, M., Loeys, T., & Goubert, L. (2016). Helping

motivation and well-being of chronic pain couples: A daily diary study.

Pain, *157*(7), 1551–1562. doi:10.1097/j.pain.0000000000000550

* Which datasets in that publication does this sheet apply to?: all data

3. Information about the files that have been stored

==

3a. Raw data

----

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
- [X] researcher PC
- [X] research group file server
- [ ] responsible ZAP PC

* Who has direct access to the raw data (i.e., without intervention of another person)?
- [X] main researcher
- [X] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

Appendix

3b. Other files

----

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results.

Specify:

- see method section manuscript

- see:

    o Prepare and clean data partner and patient_T1_N70.docx

    o Prepare and clean data partner_diary_N70.docx

    o Prepare and clean data patient_diary_N70.docx

    o Syntax Daily Measures Partner.sps

    o Syntax Daily Measures Patient.sps

    o Syntax Person Level Measures (T1) Partner.sps

    o Syntax Person Level Measures (T1) Patient.sps

- [X] file(s) containing processed data. Specify:

Raw data files:

- Partner_diary_22.06.15.sav

- Partner_T1_22.06.15.sav

- Patient_diary_22.06.15.sav

- Patient_T1_22.06.15.sav

- Partner_diary_22.06.15_paper.sav

- Partner_T1_22.06.15_paper.sav

- Patient_diary_22.06.15_paper.sav

- Patient_T1_22.06.15_paper.sav

Prepared data files:

- Partner_diary_22.06.15_preparation.sav

- Partner_diary_paper_22.06.15_preparation.sav

- Partner_T1_22.06.15_preparation.sav

- Patient_diary_22.06.15_preparation.sav

- Patient_diary_paper_22.06.15_preparation.sav

- Patients_T1_22.06.15_preparation.sav

Cleaned data files:

- Partner_diary_22.06.15_cleaned.sav

- Partner_diary_paper_22.06.15_cleaned.sav

- Partner_T1_22.06.15_cleaned.sav

- Patient_diary_22.06.15_cleaned.sav

- Patient_diary_paper_22.06.15_cleaned.sav

- Patients_T1_22.06.15_cleaned.sav

Final data files:

- Partner_diary_22.06.15_final.sav

- Partner_T1_22.06.15_final.sav

- Patient_diary_22.06.15_final.sav

- Patient_T1_22.06.15_final.sav

- Diary_merge_22.06.15_N70.sav

- T1_merge_22.06.15_N70.sav

- Partner_diary_and_T1_22.06.15_final.sav

- Patient_diary_and_T1_22.06.15_final.sav

- [X] file(s) containing analyses. Specify:

- analyseN70.sas

- analyse_revision.sas

- sensitivity analyses.pdf

- [X] files(s) containing information about informed consent

- Specify: a blank copy is saved on the PC of the main researcher

- [ ] a file specifying legal and ethical provisions. Specify:

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC

- [X] research group file server

- [ ] responsible ZAP PC

* Who has direct access to these other files (i.e., without intervention of
another person)?

- [X] main researcher

- [X] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction

==

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail:

% Data Storage Fact Sheet

% Name/identifier study: The effects of partners' helping motivation on chronic pain patients' functioning over time (PhD dissertation: Chapter 5)

% Author: Sara Kindt

% Date: 23/08/17

1. Contact details

===

1a. Main researcher

- name: Sara Kindt

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Sara.Kindt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Prof. dr. Liesbet Goubert

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Liesbet.Goubert@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

==

* Reference of the publication in which the datasets are reported:

Kindt, S., Vansteenkiste, M., Brenning, K., & Goubert, L. (under revision).

The effects of partners' helping motivation on chronic pain patients'

functioning over time. *Manuscript under revision for the Journal of Pain.*

* Which datasets in that publication does this sheet apply to?: all data

3. Information about the files that have been stored

==

3a. Raw data

----

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO

If NO, please justify:

* On which platform are the raw data stored?

- [X] researcher PC

- [X] research group file server

- [ ] responsible ZAP PC

* Who has direct access to the raw data (i.e., without intervention of another

person)?

- [X] main researcher

- [X] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

3b. Other files

----

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results.

Specify:

- see method section manuscript

- see:

  o Prepare clean final data T1.docx

  o Syntax Person Level Measures (T1) Partner.sps

  o Syntax Person Level Measures (T1) Patient.sps

  o Prepare clean final data T2.docx

  o Syntax Person Level Measures (T2) Partner.sps

  o Syntax Person Level Measures (T2) Patient.sps

  o Prepare clean final data T3.docx

  o Syntax Person Level Measures (T3) Partner.sps

  o Syntax Person Level Measures (T3) Patient.sps

  o Overzicht EssentieT123.xlsx

- [X] file(s) containing processed data. Specify:

Raw data files:

- partner_T1.sav

- patient_T1.sav

- partner_T2_merge.sav

- patient_T2_merge.sav

- partner_T3_merge.sav

- patient_T3_merge.sav

Prepared data files:

- partner_T1_prepared.sav

- patient_T1_prepared.sav

- partner_T2_prepared.sav
- patient_T2_prepared.sav
- partner_T3_prepared.sav
- patient_T3_prepared.sav

Cleaned data files:

- partner_T1_cleaned.sav
- patient_T1_cleaned.sav
- partner_T2_cleaned.sav
- patient_T2_cleaned.sav
- partner_T3_cleaned.sav
- patient_T3_cleaned.sav

Final data files:

- partner_T1_final.sav
- patient_T1_final.sav
- T1_merge.sav
- partner_T2_final.sav
- patient_T2_final.sav
- T2_merge.sav
- partner_T3_final.sav
- patient_T3_final.sav
- T3_merge.sav
- EssentieT123.sav
- EssentieT123.dat

- [X] file(s) containing analyses. Specify:

- mplus files (.inp; .out; .dgm) containing all main analyses

- [X] files(s) containing information about informed consent. Specify: a
blank copy is saved on the PC of the main researcher

- [ ] a file specifying legal and ethical provisions. Specify:

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

-See other files.

- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC

- [X] research group file server

- [ ] responsible ZAP PC

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher

- [X] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction
==

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail:

% Data Storage Fact Sheet

% Name/identifier study: Helping your partner with chronic pain: The importance of helping motivation, received social support and its timeliness (PhD dissertation: Chapter 6)

% Author: Sara Kindt

% Date: 23/08/17

1. Contact details

===

1a. Main researcher

- name: Sara Kindt

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Sara.Kindt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Prof. dr. Liesbet Goubert

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Liesbet.Goubert@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

===

* Reference of the publication in which the datasets are reported:

Kindt, S., Vansteenkiste, M., Josephy, H., Bernandes, S., & Goubert, L.
(under revision). Helping your partner with chronic pain: The importance of
helping motivation, received social support and its timeliness. *Manuscript
under revision for Pain Medicine.*

* Which datasets in that publication does this sheet apply to?: all data

3. Information about the files that have been stored

===

3a. Raw data

----

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
- [X] researcher PC
- [X] research group file server
- [ ] responsible ZAP PC

* Who has direct access to the raw data (i.e., without intervention of another
person)?
- [X] main researcher
- [X] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

3b. Other files

----

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results.

Specify:

- see method section manuscript
- see:
  - o survey_197582_SPSS_data_file.dat
  - o survey_197582_SPSS_syntax_file.sps
  - o survey_945541_SPSS_data_file.dat
  - o survey_945541_SPSS_syntax_file.sps
  - o Syntax Daily Measures Partner.sps
  - o Syntax Daily Measures Patient.sps
  - o Syntax Person Level Measures (T1) Partner.sps
  - o Syntax Person Level Measures (T1) Patient.sps

- [X] file(s) containing processed data. Specify:

SPSS files containing raw data and subscales

- partner_T1_N134.sav
- partner_diary_N134.sav
- patient_T1_N134.sav
- patient_diary_N134.sav

Final data files:

- merge_T1_N134.sav
- merge_diary_N134.sav

- [X] file(s) containing analyses. Specify:

- mplus files concerning multilevel CFA for item reliability
- analyse.sas

- [X] files(s) containing information about informed consent. Specify: a
blank copy is saved on the PC of the main researcher

- [ ] a file specifying legal and ethical provisions. Specify:

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

-See other files.

- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC

- [X] research group file server

- [ ] responsible ZAP PC

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher

- [X] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction
===
* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail:

% Data Storage Fact Sheet

% Name/identifier study: When is your partner willing to help you? The role of daily goal conflict and perceived gratitude. (PhD dissertation: Chapter 7)

% Author: Sara Kindt

% Date: 23/08/17

1. Contact details

===

1a. Main researcher

- name: Sara Kindt

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Sara.Kindt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Prof. dr. Liesbet Goubert

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Liesbet.Goubert@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

===

* Reference of the publication in which the datasets are reported:

Kindt, S., Vansteenkiste, M., Cano, A., & Goubert, L. (2017). When is your partner willing to help you? The role of daily goal conflict and perceived gratitude. *Manuscript accepted pending minor revisions for Motivation and Emotion.*

* Which datasets in that publication does this sheet apply to?: all data

3. Information about the files that have been stored

===

3a. Raw data

----

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
- [X] researcher PC
- [X] research group file server
- [ ] responsible ZAP PC

* Who has direct access to the raw data (i.e., without intervention of another person)?
- [X] main researcher
- [X] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

3b. Other files

----

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results.

Specify:

- see method section manuscript
- see:
    o Prepare and clean data partner and patient_T1_N64.docx
    o Prepare and clean data partner_diary2_N64.docx
    o Prepare and clean data patient_diary2_N64.docx
    o Syntax Daily Measures Partner.sps
    o Syntax Daily Measures Patient.sps
    o Syntax Person Level Measures (T1) Partner.sps
    o Syntax Person Level Measures (T1) Patient.sps

- [X] file(s) containing processed data. Specify:

Raw data files:

- Partner_diary2_03.08.15.sav
- Partner_T1_03.08.15.sav
- Patient_diary2_03.08.15.sav
- Patient_T1_03.08.15.sav
- Partner_diary2_03.08.15_paper.sav
- Partner_T1_03.08.15_paper.sav
- Patient_diary2_03.08.15_paper.sav
- Patient_T1_03.08.15_paper.sav

Prepared data files:

- Partner_diary2_03.08.15_preparation.sav
- Partner_diary2_paper_03.08.15_preparation.sav
- Partner_T1_03.08.15_preparation.sav

- Patient_diary2_03.08.15_preparation.sav
- Patient_diary2_paper_03.08.15_preparation.sav
- Patients_T1_03.08.15_preparation.sav

Cleaned data files:

- Partner_diary2_03.08.15_cleaned.sav
- Partner_diary2_paper_03.08.15_cleaned.sav
- Partner_T1_03.08.15_cleaned.sav
- Patient_diary2_03.08.15_cleaned.sav
- Patient_diary2_paper_03.08.15_cleaned.sav
- Patients_T1_03.08.15_cleaned.sav

Final data files:

- Partner_diary2_03.08.15_final.sav
- Partner_T1_03.08.15_final.sav
- Patient_diary2_03.08.15_final.sav
- Patient_T1_03.08.15_final.sav
- Partner_diary2_03.08.15_merge.sav
- Patient_diary2_03.08.15_merge.sav

- [X] file(s) containing analyses. Specify:

- analyseN64.sas
- analyseN64_revision.sas

- [X] files(s) containing information about informed consent. Specify: a blank copy is saved on the PC of the main researcher

- [ ] a file specifying legal and ethical provisions. Specify:
- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC

- [X] research group file server

- [ ] responsible ZAP PC

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher

- [X] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction

==

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail:

% Data Storage Fact Sheet

% Name/identifier study: "What should I do first?" The effect of
manipulated goal conflict on affect, motivation and helping behavior in
chronic pain couples. (PhD dissertation: Chapter 8)

% Author: Sara Kindt

% Date: 23/08/17

1. Contact details

===

1a. Main researcher

- name: Sara Kindt

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Sara.Kindt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Prof. dr. Liesbet Goubert

- address: Henri Dunantlaan 2 - 9000 Gent - Belgium

- e-mail: Liesbet.Goubert@UGent.be

If a response is not received when using the above contact details, please
send an email to data.pp@ugent.be or contact Data Management, Faculty of
Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent,
Belgium.

2. Information about the datasets to which this sheet applies

==

* Reference of the publication in which the datasets are reported:

Kindt, S., Vansteenkiste, M., De Ruddere, L., Cano, A., & Goubert, L.
(under review). "What should I do first?" The effect of manipulated goal
conflict on affect, motivation and helping behavior in chronic pain.
Manuscript under review for Pain.

* Which datasets in that publication does this sheet apply to?: all data

3. Information about the files that have been stored

==

3a. Raw data

----

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO
If NO, please justify:

* On which platform are the raw data stored?
- [X] researcher PC
- [X] research group file server
- [ ] responsible ZAP PC

* Who has direct access to the raw data (i.e., without intervention of another
person)?
- [X] main researcher
- [X] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

3b. Other files

----

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results.

Specify:

- see method section manuscript

- see:

  o DATA CLEANING.docx

  o algemene gegevens.sps

  o baseline partner.sps

  o baseline patient.sps

  o experiment vragenlijsten.sps

- [X] file(s) containing processed data. Specify:

Raw data files:

- Experiment_algemene_gegevens_RAW.sav

- Experiment_baseline_partner_RAW.sav

- Experiment_baseline_patient_RAW.sav

- Experiment_vragenlijsten_RAW.sav

Cleaned data files:

- Experiment_algemene_gegevens_cleaned.sav

- Experiment_baseline_partner_cleaned.sav

- Experiment_baseline_patient_cleaned.sav

- Experiment_vragenlijsten_cleaned.sav

  Final data files:

- EXP_MEGAFILE.sav

- EXP_MEGAFILE_metexclusie.sav

- EXP_coding_19.04.17.sav

- EXP_merge.sav

- EXP_merge_exclusion.sav
- EXP_finaleanalyses.sav
- EXP_finaleanalyses_metexclusie.sav

- [X] file(s) containing analyses. Specify:
    - different SPSS .sps files

- [X] files(s) containing information about informed consent
    - Specify: a blank copy is saved on the PC of the main researcher

- [ ] a file specifying legal and ethical provisions. Specify:
- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- [ ] other files. Specify: ...

* On which platform are these other files stored?
- [X] individual PC
- [X] research group file server
- [ ] responsible ZAP PC

* Who has direct access to these other files (i.e., without intervention of another person)?
- [X] main researcher
- [X] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

4. Reproduction

==

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail: