Thank You for Changing: Gratitude Promotes Autonomous Motivation and Successful Partner Regulation

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Abstract

Romantic partners often attempt to improve their relationship by changing each other's traits and behaviors, but such partner regulation is often unsuccessful. We examined whether gratitude expressed by agents (i.e., partners requesting change) facilitates greater regulation success from targets (i.e., partners making change) by encouraging targets' autonomous motivation. Across studies, including observational (Study 1, $N = 111$ couples), preregistered longitudinal (Study 2, $N = 150$ couples), and experimental (Study 3a, $N = 431$; Study 3b, $N = 725$) designs, agents' gratitude for targets' efforts was linked to greater targets'—and less consistently agents'—reported regulation success. These effects were consistently mediated by greater target autonomous motivation, and generally persisted when accounting for how agents communicated their change request and other positive responses to targets' efforts (e.g., positivity and support). Gratitude for targets' efforts appears to be an important tool for promoting change success.

To try and improve their relationships, romantic partners commonly engage in *partner regulation* (i.e., attempts to change aspects of one another; Overall et al., 2006). Partner regulation may arise from motivation to resolve inevitable and recurring disagreements (Righetti et al., 2022) (e.g., about trust or spending money; Bradbury & Karney, 2004), or to promote relationship growth (Knee et al., 2002). However, receiving a change request can elicit intense negative emotions in the targeted partner (Sisson et al., 2022) and lead targets to feel as though they are failing to meet their partner's (i.e., the agent's) needs (Overall & Fletcher, 2010) or their own communal goals (Clark et al., 2010). While these consequences may promote initial efforts to change to relieve distress, they are unlikely to promote the sustained motivation necessary to achieve regulation success (i.e., for targets to make the requested change). As such, understanding how agents can promote long-term motivation and change success seems critical.

Guided by self-determination theory (SDT; Deci & Ryan, 2000), this work focuses on targets' autonomous motivation for partner-requested change (i.e., pursuing change goals for their own enjoyment and personal value; Deci & Ryan, 2000; Kindt et al., 2017; Sheldon & Elliot, 1999) as a key contributor to

targets' sustained effort and regulation success. Because changing for one's partner likely requires costly effort, an optimal way to promote autonomous motivation may be to provide positive feedback about targets' efforts. Indeed, research suggests that certain types of feedback can help individuals derive more satisfaction from the efforts they make toward a goal and personally identify with a goal as a valuable pursuit (Kindt et al., 2017; Koestner et al., 2012).

In the context of partner regulation, agents' expressions of gratitude may be a common yet optimal form of positive feedback. Receiving expressions of gratitude plays a key role in promoting relationship-maintenance behaviors (e.g., Algoe et al., 2016; Kindt et al., 2017) and highlights that one

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has provided a meaningful benefit to the recipient (e.g., Sonnentag & Grant, 2012). For targets, gratitude may signal that they are moving toward meeting the agent's (i.e., their partner's) needs, and romantic partners often strongly identify with and feel authentic when acting communally (Clark et al., 2010). Thus, agents' gratitude—which indeed emerged as a common type of feedback agents provide in response to targets' change efforts (see the supplement)—may promote autonomous motivation in targets and, ultimately, greater regulation success. We tested these hypotheses in a series of multimethod studies.

Partner Regulation Success: What Happens After Requests for Change?

Partner regulation involves changes directed or requested by one's *romantic partner*, distinguishing these changes from other shared goal pursuits in which both partners work toward moving one partner toward their ideal version of *themselves* (e.g., responsive shared goal support; Feeney, 2004, the Michelangelo Phenomenon; see Rusbult et al., 2009 for a review). Partner regulation research has focused on the ways in which agents can effectively communicate their desired change to targets (e.g., Overall, 2018; Overall et al., 2006, 2009). This work has differentiated requests for change along two orthogonal dimensions of valence (positive vs. negative) and directness (direct vs. indirect), which produce four distinct communication categories: positive-direct (e.g., suggesting solutions), negative-direct (e.g., blaming the partner), positive-indirect (e.g., using humor), and negative-indirect (e.g., inducing guilt) (Overall, 2018; Overall et al., 2009).

Although direct communication strategies—which clearly highlight a need for change—are more effective in promoting change success than indirect strategies (Overall et al., 2009), they also risk several negative outcomes for targets (Overall et al., 2009; Overall & Simpson, 2013). For example, targets who receive or perceive more negative agent communication feel less regarded by their partners and often feel negative emotions and immediate resistance, which can prompt less regulation effort (Overall & Fletcher, 2010; Overall & Simpson, 2013). These negative consequences for targets are likely why even the most effective communication strategies only predict small amounts of partner change over the course of several months (e.g., Overall et al., 2009).

Crucially, partner regulation literature focusing on initial change requests is missing a key part of the partner regulation process—how agents respond to targets' subsequent efforts to change—which could provide insight into how to more effectively promote motivation to change in targets. This oversight is problematic because most desired changes involve changing long-term habits or personality traits (Overall et al., 2009) and thus require sustained motivation

and effort that is unlikely to be supported by a single change request.

Autonomous Motivation as a Key Driver of Motivation and Success

To understand how targets can stay motivated to pursue costly change efforts, we draw on SDT (Deci & Ryan, 2000). SDT specifies the conditions that enhance people's motivation to pursue goals (Ryan & Deci, 2017), including goals in close relationships (e.g., caregiving; Barry et al., 2021). More specifically, people vary in the extent to which they are motivated to pursue goals (e.g., make change efforts) for the sake of their own fulfillment and personal value (i.e., *autonomous* motivation; Deci & Ryan, 2000; Kindt et al., 2017; Sheldon & Elliot, 1999). Indeed, such motivation—also referred to as enduring motivation (Stone et al., 2009)—has been linked to increased positive relationship behavior and goal persistence (Grant & Gino, 2010; Knee et al., 2002; Koestner et al., 2012; Weinstein & Ryan, 2010).

However, few attempts have been made to investigate the role of autonomous motivation or the conditions that promote autonomous motivation in understanding the processes that could promote goal achievement (cf. Koestner et al., 2012; Rochette et al., 2022), particularly in the context of romantic partner regulation. Applying the broader work identifying key ingredients of self and other-regulation success, we propose that the degree to which targets enjoy and are personally invested in the change process likely hinges on how their partners (i.e., agents) *respond* to their initial efforts to change. Indeed, theoretical (Austin & Vancouver, 1996; Carver & Scheier, 2012; Milyavskaya & Werner, 2018) and empirical work (e.g., Wilkowski & Ferguson, 2016) on goal achievement demonstrates that beyond the initial realization that effort is needed to complete a goal, successful goal achievement requires *monitoring goal progress*. Applying this to partner regulation dynamics, successful partner regulation likely requires targets to receive positive feedback about their efforts to change.

Receiving positive feedback about efforts to change may serve as a signal that targets' efforts are appreciated, satisfying, and valuable pursuits. Specifically, receiving positive goal feedback can promote goal motivation when it elicits positive affect (Fishbach et al., 2010). Similarly, agents' perceived and reported positive responses to targets' efforts may serve as a signal that the target is effectively moving closer to agents' ideals, which has been associated with more successful change (Sisson et al., 2022). Given that this positive feedback may help targets feel more positively about their efforts, and that romantic partners tend to strongly value acting communally (Clark et al., 2010), we propose that positive agent feedback may lead targets to intrinsically want (i.e., become autonomously motivated) to make their partner's requested change.

Gratitude as an Effective Response to Promote Autonomous Motivation

We propose that agents' *gratitude* in response to change efforts may clearly acknowledge the targets' efforts and provide optimal positive and motivating feedback. Gratitude has been defined as a "blend of admiration and joy" (McCullough et al., 2001) that is elicited when one receives a valuable benefit that is costly to the benefactor, like agents receiving targets' costly efforts toward their requested change. Although no work has examined the role of gratitude in the context of partner regulation, receiving expressions of gratitude has been robustly linked to relationship-maintenance behavior (e.g., Algoe et al., 2016) and prosocial behavior (Lee et al., 2019), as well as motivations for these behaviors (Kindt et al., 2017). For example, perceiving gratitude for efforts to help a partner cope with pain was linked to subsequent autonomous motivation to engage in further helping behavior (Kindt et al., 2017). Extending this line of work, we propose that receiving gratitude for change efforts may promote more autonomous motivation to change for one's partner and ultimately foster greater regulation success.

Research Overview

In a multimethod investigation of partner regulation processes, we utilized dyadic observational (Study 1) and longitudinal (Study 2) designs, complemented by experimental (Studies 3a and 3b) designs, to test whether agents' gratitude for targets' change efforts promotes regulation success through promoting targets' autonomous motivation to change. To capture regulation success, we assessed the extent to which targets were motivated to change, engaged in efforts to change, and were successful at changing, with operationalizations suited to the study design (see Table 1 for operationalizations across studies).

In Studies 1 and 2, we also tested three sets of control models to determine the unique benefits of gratitude as a response to change efforts. First, gratitude may overlap with positive and direct change requests, which have generally been linked to change success (Overall et al., 2009), although it may also be correlated with negative-indirect requests. Second, gratitude communicates positive regard for a target and their actions and thus may share core features with other positive responses to change efforts (e.g., support). Gratitude for change efforts may also be indicative of general gratitude expressed by agents. As such, we tested whether there were unique benefits of agents' gratitude for change efforts above and beyond (1) communication of change requests, (2) other positive agent responses (e.g., support), and (3) general gratitude in the relationship (where measures permitted; see Table 1).[1] Materials, data, code, and preregistrations are available on the Open Science Framework (https://osf.io/xzvyk/).

Study 1

The purpose of Study 1 was to provide an initial test of the direct associations between agent gratitude and regulation success. Couples discussed partner-requested changes in the laboratory and both partners reported on agents' felt gratitude—which should theoretically lead to expressed gratitude (Algoe, 2012) and thus was used as a proxy—anticipated regulation success, and actual regulation success 2 weeks later. We expected that greater agent gratitude (as reported by agents and targets) would be linked to greater anticipated and actual regulation success as reported by agents and targets. We expected that these patterns would persist beyond communication of change requests and other positive partner communication and behaviors.

Method

Participants. A total of 111 Canadian couples (*N* = 222) were recruited from the Greater Toronto Area community and a Canadian university through outreach and online advertisements (see Table 2 for participant demographics). To be eligible for the study, participants needed to be at least 18 years old and in a relationship for a minimum of 1 year. We aimed to recruit 100 couples based on available resources and other laboratory-based studies around the time of data collection (2015–2016) that tested associations between variables among partners requesting change (>60 couples; Overall et al., 2006, 2009). We retained 11 additional couples to compensate for any potential missing data (e.g., due to incomplete surveys). Given that this study constitutes secondary data use, we did not preregister but did conduct sensitivity power analyses with the *simr* R package (Green & MacLeod, 2016)—which was not designed for dyadic models and cannot model separate actor and partner effects but does account for the nested structure of dyadic data. This sample size has 80% power to detect medium effect sizes (i.e., R^2 = .30 at level 1, R^2 = .31 at level 2 in the lab data; R^2 = .32 at level 1, R^2 = .37 at level 2 in the follow-up data) but is underpowered to detect small effect sizes.

Procedure. As part of a larger study, both partners provided demographic data, and then came to the lab for a 2-hour interaction procedure (adapted from Fritz et al., 2003). Couples engaged in a series of 6-minute video-recorded discussions (see supplement for procedural details). Two of these conversations—the focus of this investigation—were about requested partner changes. One member of the couple was randomly assigned to be the first agent and communicated their desired change to the target for 1 minute while the target listened. Targets were then given 1 minute to respond. Each partner was given another minute to speak before both partners spoke freely for 2 minutes. Participants then swapped roles and completed the second

Table 1. Operationalizations of Key Variables Across Studies.

Variable	Study 1		Study 2		Study 3a	Study 3b
	Target-reported	Agent-reported	Target-reported	Agent-reported	Target-reported	Target-reported
Predictor:						
Gratitude for change efforts	Perceived agent gratitude felt during change conversation	Gratitude felt during change conversation	Perceived agent gratitude for change efforts: prior to beginning diary (baseline), this week (weekly), and over the last 6 months (follow-up)	Gratitude for change efforts: prior to beginning diary (baseline), this week (weekly), and over the last 6 months (follow-up)	Imagined their partner saying a specific expression of gratitude for change effort	Imagined their partner saying something that expressed gratitude for change effort
Mediator:						
Autonomous motives	Not assessed	Not assessed	Self-reported autonomous motives for engaging in change efforts this week (weekly diary)	Not assessed	Self-reported autonomous motives for engaging in change efforts	Self-reported autonomous motives for engaging in future change efforts
Outcome:						
Regulation success	Anticipated effort and success (in-lab) Actual effort and success two weeks later (follow-up)	Anticipated target effort and success (in-lab) Actual target effort and success two weeks later (follow-up)	Motivation, effort, and progress: prior to beginning diary (baseline), this week (weekly diary), over the last 6 months (follow-up)	Perceived target motivation, effort, and progress: prior to beginning diary (baseline), this week (weekly diary), over the last 6 months (follow-up)	Motivation to change, intention to make efforts	Motivation to change, intention to make efforts, and anticipated success
Control variables:						
Partner change request strategies	**Independent-rater** coded positive-direct, positive-indirect, and negative-indirect communication to target during the change conversation		Perceived agent positive-direct, positive-indirect, negative-direct, and negative-indirect communication this week (weekly diary)	Positive-direct, positive-indirect, negative-direct, and negative-indirect communication to target this week (weekly diary)	Not assessed	Not assessed
Positive agent responses/behaviors	Perceived agent general gratitude during the change conversation	Self-reported general gratitude to target during the change conversation	Perceived agent general gratitude prior to beginning diary (baseline) Perceived agent generally positive responses to change efforts this week (weekly diary)	General gratitude to target prior to beginning diary (baseline) Generally positive responses to target change efforts this week (weekly diary)	Gratitude condition compared to a generally positive response condition and a neutral control condition	Gratitude condition compared to a generally positive response condition and an autonomy support condition

Note. Except for Study 1, gratitude for change efforts is always assessed with items adapted from Appreciation in Relationships (AIR) scale (Gordon et al., 2012). General gratitude is always assessed via the AIR scale. Studies 1 and 2 were dyadic and thus include target and agent-reported variables, whereas Studies 3a and 3b included only targets.

Table 2. Demographic Variables Across Studies.

	Study 1	Study 2	Study 3a	Study 3b
Gender	48.2% women, 49.5% men, 1.5% other	50.7% women, 47.0%, 2.3% as nonbinary	62.4% women, 36.8% men, 0.7% nonbinary and other	64.7% women, 34.5% men, 0.6% nonbinary, 0.3% prefer not to say
Age (yrs)	26.76 (SD = 7.17, range = 18–57)	28.04 (SD = 5.80, range = 18–57)	34.54 (SD = 10.38, range = 18–74)	41.33 (SD = 11.13, range = 21–76)
Sexual orientation	Not assessed	78.1% heterosexual, 10.3% bisexual, 3.3% asexual, 3.3% pansexual, 2.7% lesbian, 1.3% gay, 1% other	84.9% heterosexual, 7.9% bisexual, 2.8% gay, 1.6% asexual, 1.2% lesbian, 0.7% pansexual, 0.9% other	87.6% heterosexual, 5.9% bisexual, 2.1% asexual, 2.1% pansexual, 1.2% lesbian 0.8% gay, 0.1% prefer not to say
Relationship length (Yrs.)	4.13 (SD = 2.67)	5.07 (SD = 4.51)	10.12 (SD = 8.36)	14.91 (SD = 10.36)
Relationship type	75.5% committed and unmarried, 23.2% married, 1.4% unreported	59.3% not engaged or married, 28.7% married, 12.0% engaged	52.9% married, 33.2% exclusively dating, 13.0% engaged, 0.7% casually dating	78.1% married, 14.2% exclusively dating, 7.4% engaged, 0.3% casually dating
Ethnic/racial identity	22.7% Western European, 16.8% South Asian, 7.3% Eastern European, 6.4% Caribbean, 5.0% South American, 2.3% African, 2.3% Middle Eastern, 2.3% Southeast Asian, 10.9% East Asian, 1.0% Native American, 16.4% bi- or multiethnic, 5.5% other	26% Western European, 13.7% East Asian, 10.3% Eastern European, 9.0% South Asian, 4.7% South East Asian, 4.0% African, 2.7% Caribbean, 2.7% Middle Eastern, 2.0% South American, 1% Native American/Indigenous, 14.7% bi- or multiethnic, 8.7% another ethnicity not listed	68.9% Western European, 8.8% Eastern European, 3.0% Middle Eastern, 3.0% South American, 1.4% African, 1.4% Caribbean, 1.4% South Asian, 0.9% East Asian, 0.7% South East Asian, 3.7% bi-/multiethnic, 6.7% other	81.9% White, 5.1% Black, 4.3% East Asian, 3.7% Latin American, 1.1% South Asian, 0.6% Native American, 2.5% bi-/multiethnic, 0.8% another identity than the options listed
Socioeconomic status	Education: 1.4% less than high school, 39.5% high school or some university, 5.5% associates, vocational, or 2-year degree, 40.0% Bachelors degree, 10.0% Masters degree, 0.9% JD, MBA or other 2- to 3-year graduate program, 1.4% PhD or MD, 1.4% did not report	Education: 0.7% less than high school, 4.3% high school/GED, 9.3% some college/technical school/university, 7.3% 2-year college/technical school/university degree/diploma (e.g., AA, AS), 40.0% 4-year college/university degree (e.g., BA, BS), 27.7% Master's degree (e.g., MA, MS, MEng, MBA), 3.0% professional degree (e.g., MD, JD), 4.0% doctorate degree (e.g., PhD, EdD), 3.7% other	Not assessed	Ladder item where higher numbers indicate being better off relative to other people in participants' current city/town: 1.0% at the bottom of the ladder (1), 2.9% at 2, 10.3% at 3, 12.6% at 4, 19.9% at 5, 28.6% at 6, 18.3% at 7, 5.1% at 8, 1.2% at 9, and 0.1% at the top of the ladder (10)

change conversation. Common requests for change included changing personal characteristics (e.g., emotional expression) and behaviors (e.g., exercise) (see the supplement for data about the content of change requests). Almost all participants reported that they had previously discussed the requested change (95.9% of targets; 99.1% of agents) indicating that these were ongoing change processes toward which targets had likely made some effort.

Immediately following each conversation, targets and agents reported on agents' felt gratitude during the interaction and how successful they anticipated the regulation would be. Two weeks later, both partners completed an online survey and reported on actual regulation success. Due to an error in survey question randomization, one third of the participants were not shown the regulation success items. These missing data reduce statistical power (and these

missing data were accounted for in the power analyses above) but should not systematically bias effects because the data were missing at random. Participants were compensated up to $55. This study was approved by the University of Toronto ethics board (protocol #31063). Materials, data, and code are available at https://osf.io/xzvyk/.

Measures

Gratitude. Targets' perceptions of agents' gratitude and agents' self-reports of their own gratitude during the change conversation were assessed on a 10-point scales (1 = *not at all* to 10 = *as much as I've/they've ever felt*). See Table 3 for descriptive statistics and reliabilities.

Anticipated Regulation Success. Targets' anticipated regulation success was assessed with a composite of the items, "To

Table 3. Zero-Order Correlations and Descriptive Statistics Among Study 1 Key Variables.

M	SD	Reliability	Variables	1	2	3	4	5	6
3.09	2.47	—	1. Target-perceived gratitude	–					
4.35	2.89	—	2. Agent-reported gratitude	.28**	–				
5.27	1.18	$r = .57$	3. Target-anticipated success	.23**	−.03	–			
4.61	1.56	$r = .75$	4. Agent-perceived anticipated success	.28**	.39**	.26**	–		
4.95	1.19	$r = .75$	5. Target-reported actual regulation success	.07	−.10	.27**	.26**	–	
4.75	1.60	$r = .83$	6. Agent-perceived actual regulation success	.13	.20*	.21*	.49**	.21	–

Note. Variables 1–4 were measured in-lab, and variables 5–6 were measured at the 2-week follow-up.
*$p < .05$, **$p < .01$.

what extent will you put in the effort to make this change for your partner?" on a scale of 1 (*not at all*) to 7 (*a lot*) and "How successful do you think you will be in making this change?" on a scale of 1 (*not at all successful*) to 7 (*extremely successful*). Agent-perceived anticipated success was similarly assessed as a 2-item composite (e.g., "To what extent do you think your partner will put in the effort to make this change for you?") using the same rating scale.

Actual Regulation Success. Two weeks later, we assessed regulation success according to targets with a composite of the items "To what extent did you try to make the changes your partner requested in the initial lab conversation?" (1 = *did not try to change at all* to 7 = *tried very hard to change*) and "To what extent do you feel that you were successful in making the changes your partner requested in the initial lab conversation?" (1 = *not at all successful* to 7 = *extremely successful*). Agents' perceptions of regulation success were assessed with a composite of mirrored versions of these items (e.g., "To what extent did your partner try to make the changes you requested in the initial lab conversation?").

Agent Change Request Control Variables. As in prior research (e.g., Overall et al., 2009), agents' partner regulation communication strategies during the change conversation were assessed by four independent coders. Coders were given descriptions of each strategy and then rated the strategies as positive-direct (*M* = 3.06, *SD* = 0.59, ICC = .60), positive-indirect (*M* = 2.79, *SD* = 0.67, ICC = .72), negative-direct (*M* = 1.95, *SD* = 0.64, ICC = .73) and negative-indirect (*M* = 1.95, *SD* = 0.67, ICC = .74) on a 5-point scale (1 = *not at all* to 5 = *extremely*).

Agent Positive Communication and Behavior Control Variables. Targets' perceptions of agents' general gratitude were assessed in the initial online survey with an average of all seven items from the appreciated subscale of the Appreciation in Relationships (AIR) scale (e.g., "My partner makes sure I feel appreciated"; Gordon et al., 2012) which were rated on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree; M* = 5.30, *SD* = 1.21, α = .88). Agents'

self-reported gratitude was assessed with an average of the 9-items of the appreciative subscale of the AIR (e.g., "I often tell my partner how much I appreciate her or him"), using the same rating scale (*M* = 5.33, *SD* = 0.87, α = .79).

Results

We tested multilevel models with random intercepts and fixed slopes in which participants were nested within couples to account for interdependence among couples. All models utilized maximum likelihood estimation and all predictors (i.e., gratitude and control variables) were grand mean centered prior to analysis. See Table 3 for zero-order correlations. All analyses were conducted using SPSS Version 26.0.

Target Perceived Gratitude. We first tested models with target perceptions of agent gratitude for their efforts separately predicting agents' and targets' reports of anticipated target regulation success and actual regulation success 2 weeks later. As expected, targets who perceived the agent to be more grateful during their interaction reported significantly greater anticipated regulation success, as did their partners (i.e., the agents) (see Table 4). However, no links to follow-up outcomes were significant. Thus, targets who perceived their partner to be more grateful when discussing the request— and their partners—anticipated that regulation would be more successful.

Agent-Reported Gratitude. We then tested models with agent reports of their own gratitude in response to targets' efforts separately predicting agents' and targets' reports of anticipated target regulation success and actual regulation success 2 weeks later. As predicted, agents who reported feeling more grateful during the interaction anticipated their partner would be significantly more successful and reported that their partner was actually more successful 2 weeks later (see Table 4). Thus, agents who felt more grateful when discussing their requested change with their partner consistently perceived their partner's regulation to be more successful both immediately and 2 weeks later.

Table 4. Models of In-Lab Agent Gratitude Predicting Immediate and Follow-Up Study 1 Outcomes.

Outcome	B	SE	df	t	p	R^2	95% CI	
							LL	UL
Predictor: Target-perceived gratitude								
Target-anticipated success	**.10**	.03	199.84	3.29	**.001**	.051	.04	.16
Agent-perceived anticipated success	**.11**	.04	187.21	2.88	**.004**	.042	.36	.19
Target-reported actual regulation success	.03	.04	122.00	0.86	.394	.006	−.05	.11
Agent-perceived actual regulation success	.06	.05	115.77	1.12	.263	.011	−.04	.17
Predictor: Agent-reported gratitude								
Target-anticipated success	−.02	.03	192.18	−0.83	.406	.004	−.08	.03
Agent-perceived anticipated success	**.19**	.03	201.14	5.52	**<.001**	.132	.12	.25
Target-reported actual regulation success	−.04	.04	117.99	−1.12	.267	.010	−.11	.03
Agent-perceived actual regulation success	**.10**	.05	118.18	2.25	**.026**	.041	.01	.19

Note. The first four outcomes were measured in-lab and the last four were measured at the 2-week follow-up. CI = confidence interval; *LL* = lower limit, *UL* = upper limit. Significant effects are bolded.

Discriminatory Analyses. We then recalculated the effects in Table 4 controlling (one at a time) for positive-direct, positive-indirect, negative-direct, and negative-indirect partner regulation communication strategies, as well as agents' general gratitude to test for the unique effects of gratitude above and beyond communication of change requests and other positive responses to change efforts (see supplement for all control model statistics). All results remained significant except for the link between agent-reported gratitude and agents' reports of targets' regulation success 2 weeks later. This link only remained significant when controlling for negative-indirect requests (*p* = .033).

Discussion

This study provided initial correlational support for the link between agent gratitude, and both agent and target reports of regulation success. Notably, all immediate regulation success results persisted above and beyond the way that agents communicated their desire for their partner to change and agents' general gratitude. However, this study assessed felt (vs. expressed) gratitude. This may explain the discrepant findings for target-anticipated success, given that targets may not be able to detect agent gratitude that is not explicitly expressed (Tissera et al., 2023). Furthermore, this sample did not include an assessment of autonomous motives underlying change efforts, and thus we could not test indirect links between gratitude and regulation success. Given that a third of the participants did not receive the follow-up regulation success items, we also may not have had sufficient power to detect effects at follow-up, and/or 2 weeks may not be a long enough gap in assessments to detect perceivable regulation success, especially given that partner-requested changes often involve changing long-established communication or behavioral habits (e.g., emotional expression, eating habits). We address these limitations in subsequent studies utilizing assessments of expressed (vs. felt) gratitude, assessments of autonomous motivation, and larger sample sizes with longitudinal and experimental designs.

Study 2

Study 1 suggested some unique benefits of gratitude on change success despite the short 2-week follow-up interval and the small sample size. Building on a preliminary online study testing the mediating role of autonomous motivation[2], we tested our key mediation hypothesis in Study 2 by including autonomous motivation and assessing regulation success over a longer period.

We employed two different analytical strategies to examine both weekly within-person associations and long-term associations among agents' gratitude (referring to both agent reports and target perceptions) for change efforts, targets' autonomous motivation, and regulation success. In the first approach, we utilized eight consecutive weekly measurements of our key variables to test the hypothesis that intraindividual fluctuations in both partners' reports of agent gratitude, target-reported autonomous motives, and both partners' reports of regulation success would be positively interrelated at the within-person level, and that these fluctuations in gratitude would positively predict outcomes the following week. In the second approach, we utilized data from a 9-month follow-up survey to test our hypothesis that agents' gratitude for targets' change efforts at baseline would predict greater long-term regulation success through greater autonomous motives across the diary, while controlling for baseline regulation success. We again tested whether any benefits of agents' gratitude for targets' change efforts would persist while accounting for communication of change requests and other positive agent communication or behavior. The study design, hypotheses, and analysis plans were all preregistered prior to analysis but after data collection (https://osf.io/xzvyk/).

Method

Participants

A total of 151 community couples (*N* = 302) were recruited from Canadian and U.S. communities through online advertisements (see Table 2 for participant demographics). However, one couple withdrew from the study and was removed prior to analyses. This sample size was predetermined based on available resources and past research examining links to romantic relationship outcomes using repeated measures designs (122 couples; Impett et al., 2019). Sensitivity power analyses using the *simr* R package (Green & MacLeod, 2016) revealed that this sample size gave us 80% power to detect small to medium between-person effect sizes (i.e., R^2 = .08 at level 1, R^2 = .17 at level 2).[3] We evaluated power for our within-person analyses a priori by computing a Monte Carlo simulation analysis in Mplus 8.5 based on recommendations by Wang and Wang (2019). With 150 couples surveyed across 8 weeks, these analyses revealed that we had greater than 99.99% power to detect small within-person associations.

Procedure

Interested couples completed a screening survey and were eligible for the study if they were at least 18 years old, living together in Canada or the United States, and had been in a relationship for at least 1 year. In this survey, participants were asked to "Please list 3 aspects of your partner that you would like your partner to change" and "Please list 3 aspects of yourself that you would like to change." Similar to procedures in prior research (e.g., Overall et al., 2006), to ensure the change was partner-requested and not a mutual goal, the research team selected desired changes for each member of the couple that the agent highly desired, but the target did not report desiring to change. Thus, each participant acted as both an agent and a target. Researchers then spoke to each participant on the phone to inform them about which requested changes they would be reporting on in all future parts of the study. Commonly requested changes included changing personal characteristics (e.g., patience) and behaviors (e.g., spending habits).

Participants first completed a 1-hour baseline survey, followed by eight weekly surveys, and a 6-month follow-up survey (i.e., roughly 9 months after baseline). Individual weekly survey links were sent every Saturday at 5:00 pm and participants were given until 11:59 pm on Monday to complete the survey. There was a low incidence of missing data across the weekly diaries, with a total of 91% of surveys (*N* = 2,178 reports) at least partially completed. Retention throughout the study was also high, with 82% of participants (*N* = 245) completing the follow-up survey. Participants were entered into a draw for a $100 gift card for completing screening and received up to $70 in compensation. This study was approved by the University of Toronto ethics board (protocol #37757).

Baseline Measures

See Table 5 for example items, descriptives, and reliabilities for all baseline measures. At baseline, targets' perceptions of their partners' (i.e., agents') gratitude for their change efforts and agents' reports of their own gratitude for targets' efforts were each assessed with an average of four items adapted from the AIR scale (Gordon et al., 2012). In addition, the extent to which targets were motivated to change for autonomous reasons was assessed with an average of four items, and target-reported and agent-perceived prior regulation success toward the selected change request were each assessed with an average of three items. Target-perceived and agent-reported general gratitude (i.e., covariates) were assessed with an average of the items from the original appreciated and appreciative subscales of the AIR scale, respectively.

Weekly Measures

See Table 5 for example items, descriptives, and reliabilities for all weekly measures.

Key Variables. Target-perceived and agent-reported gratitude were each assessed weekly with an average of two items. Targets' weekly autonomous motives to change and targets' and agents' weekly reports of regulation success were assessed with an average of the same items from the baseline survey but with regard to the last week.

Covariates. Participants also read descriptions of positive-direct, positive-indirect, negative-direct, and negative-indirect communication strategies based on prior research (Overall et al., 2009) (see supplement for descriptions), and both targets and agents rated the extent to which agents had implemented each strategy during that week with one item. Each week, target-perceived and agent-reported general positivity in response to change efforts were each assessed with an average of two items.

Follow-Up Measure

At follow-up (6 months after the final weekly survey), participants completed the same items assessing regulation success from the baseline survey but in reference to the past 6 months (target *M* = 5.13, *SD* = 1.27, α = .89; agent *M* = 5.14, *SD* = 1.42, α = .92).

Within-Person Analysis Plan

Given that our hypotheses assume that changes in received gratitude would be accompanied by corresponding changes

Table 5. Study 2 Measures: Example Items, Descriptive Statistics, and Reliabilities.

Variable		Example item	Scale anchors	M	SD	Reliability
Baseline measures:						
Change gratitude	Target-perceived	My partner makes sure I feel appreciated for trying to make this change.	1 = not at all true 7 = completely true	4.23	1.47	$\alpha = .92$
	Agent-reported	I make sure my partner feels appreciated for trying to make this change.		4.80	1.15	$\alpha = .88$
General gratitude	Target-perceived	My partner makes sure I feel appreciated.	1 = not at all true 7 = completely true	5.15	1.28	$\alpha = .89$
	Agent-reported	I make sure my partner feels appreciated.		5.30	1.00	$\alpha = .84$
Autonomous motives	Target-reported	Because making progress at this change is satisfying for me.	1 = not at all 7 = extremely	4.87	1.52	$\alpha = .91$
Prior regulation success	Target-reported	I have made progress toward this change.	1 = not at all 7 = a lot	4.38	1.17	$\alpha = .76$
	Agent-perceived	My partner has made progress toward this change.		4.19	1.30	$\alpha = .87$
Weekly measures:						
Change gratitude	Target-perceived	My partner expressed gratitude to me for trying to make this change.	1 = not at all true 7 = completely true	4.36	1.52	$r = .81$
	Agent-reported	I expressed gratitude to my partner for trying to make this change.		4.67	1.40	$r = .79$
Autonomous motives	Target-reported	Because making progress at this change is satisfying for me.	1 = not at all 7 = extremely	4.69	1.50	$Rc = .79$
Regulation success	Target-reported	This week, I have made progress toward this change.	1 = not at all 7 = a lot	4.61	1.44	$Rc = .86$
	Agent-perceived	This week, my partner has made progress toward this change.		4.56	1.47	$Rc = .90$
Change request strategies	Target-perceived	My partner encouraged me to express my feelings and point of view about the issue. They listened to me carefully and validated how I felt to make me feel comfortable so that we could reach an agreement.	1 = not at all characteristic of their communication 7 = extremely characteristic of their communication	4.55 (P-D) 4.53 (P-I) 2.81 (N-D) 3.27 (N-I)	1.41 (P-D) 1.56 (P-I) 1.69 (N-D) 1.58 (N-I)	N/A
	Agent-reported	I encouraged them to express their feelings and point of view about the issue. I listened to them carefully and validated how they felt to make them feel comfortable so that we could reach an agreement.	1 = not at all characteristic of my communication 7 = extremely characteristic of my communication	5.00 (P-D) 5.22 (P-I) 2.61 (N-D) 3.21 (N-I)	1.25 (P-D) 1.26 (P-I) 1.40 (N-D) 1.49 (N-I)	
General positivity	Target-perceived	With regard to the change you are trying to make, over the past week, to what extent was your partner happy/pleased/joyful?	1 = not at all 7= a lot	4.16	1.64	$r = .80$
	Agent-reported	With regard to the change your partner is trying to make, over the past week, to what extent were you happy/pleased/joyful?		5.08	1.37	$r = .99$

Note. P-D = positive-direct, P-I = positive-indirect, N-D = negative-direct, N-I = negative-indirect. Reliabilities for baseline measurements are reported as Cronbach's alphas and reliabilities for weekly measurements are reported as within-person reliability (indicated by Rc; Bolger & Laurenceau, 2013), with the exception of measures that only include two items. Reliabilities for two-item measures are reported as within-person correlations given that Rc calculations require at least three items. Reliability is not reported for change request strategies (these were single-item measures). All baseline, weekly, and follow-up items are in reference to the change request selected by the research team to ensure that both partners are always reporting on the same requested change. Participants were reminded what this change request was during each survey.
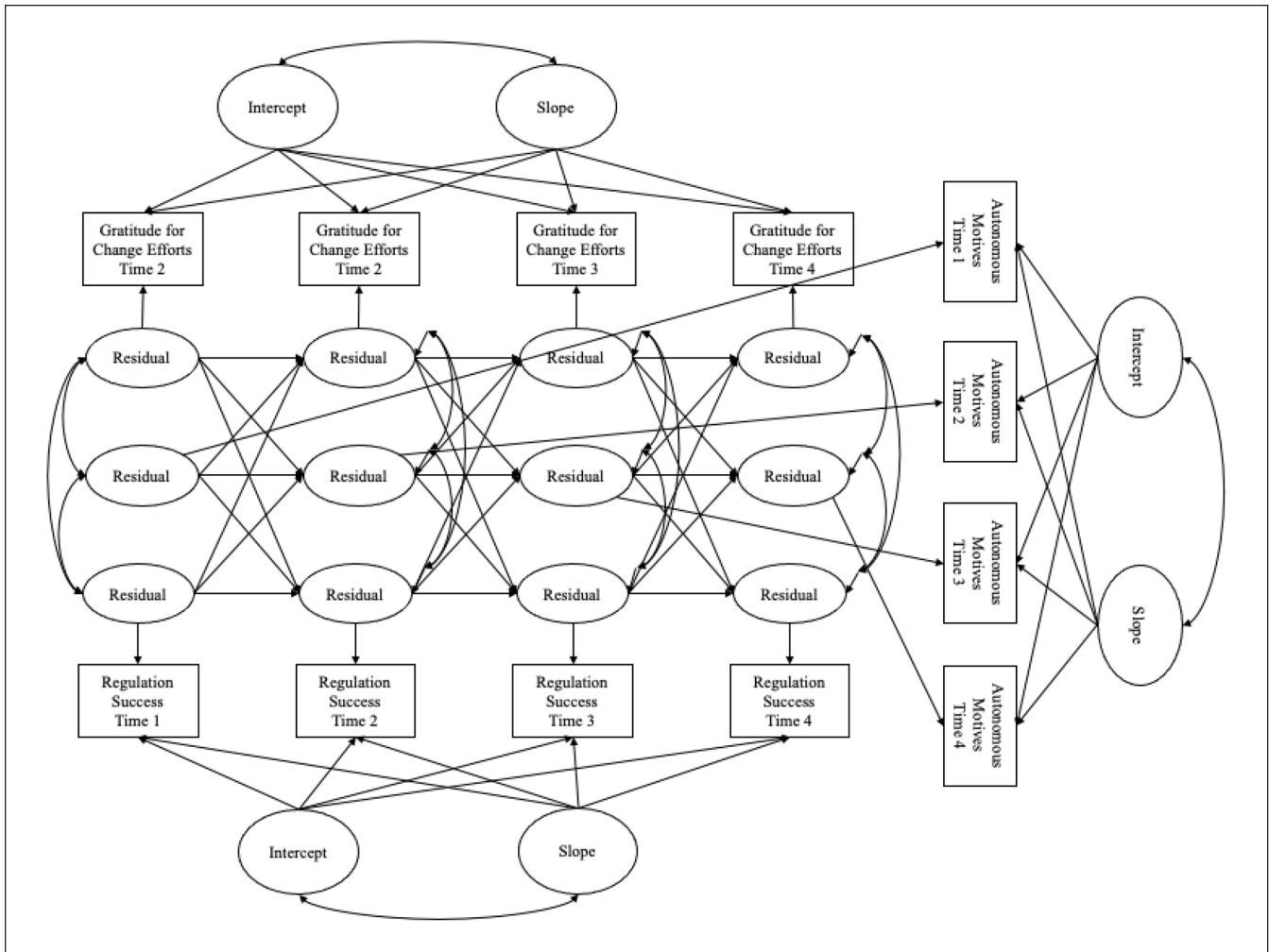
Figure 1. Prototype Latent Curve Model With Structured Residuals (LCM-SR) Depicting the Longitudinal Interrelationships of Gratitude for Change Efforts, Autonomous Motives, and Regulation Success.

in the outcomes (i.e., autonomous motives, regulation success) within a given individual, a stringent test of these within-person (vs. between-person) effects is important to make stronger causal inferences from correlational data. Toward this aim, we conducted a series of multiple group latent curve models with structured residuals (LCM-SR; Curran et al., 2014). Figure 1 depicts an example LCM-SR model for this study.

This approach allows us to isolate state-level, within-person fluctuations from stable, between-person differences by specifying latent growth constructs (i.e., intercept and slope) and time-specific residuals. The intercept and slope terms capture between-person differences in baseline levels and average trajectories of change, respectively. Hence, the construct residuals at each time point reflect within-person fluctuations from one's average trajectory after ruling out the influence of any time-invariant variables (e.g., between-person personality differences).

Hence, the cross-construct covariances among these residuals reflect the within-person associations that are central to our hypotheses: whether targets who perceive or have partners who report being more grateful than usual during a given week also report greater autonomous motives, and whether both partners also report greater regulation success than usual during the same week. Furthermore, the cross-lagged paths among the residuals also test whether within-person fluctuations in gratitude for change efforts can predict future intraindividual changes in the outcome variables the *following* week. The complete LCM-SR analysis plan is detailed in the supplement, along with between-person associations which our power analyses indicated we were underpowered to detect.

We tested four primary models, half with the *targets' perceptions* of agent gratitude for change efforts as the predictor and half with the *agents' reports* of their own gratitude for targets' change efforts as the predictor. We

Table 6. Within-Person Correlations Among Study 2 Within-Person Analysis Variables.

Variables	1	2	3	4	5
1. Target-perceived gratitude	–				
2. Agent-reported gratitude	.24***	–			
3. Target autonomous motives	.33***	.13***	–		
4. Target-reported regulation success	.56***	.27***	.40***	–	
5. Agent-perceived regulation success	.13***	.33***	.11***	.16***	–

***$p < .001$.

tested target and agent reports of regulation success in separate models and included targets' autonomous motives in all models to test potential mediation. We handled missing data by excluding participants from the analyses pairwise[4] and conducted all analyses using Mplus 8.5. See Table 6 for within-person correlations among key weekly variables.

LCM-SR Results for the Weekly Within-Person Associations

Within-Person Concurrent Associations. The results showed robust concurrent (i.e., within-time) associations among agent gratitude, target autonomous motives, and regulation success (see Table 7). Specifically, during weeks when (1) targets perceived more agent gratitude for their change efforts and (2) agents self-reported more gratitude for the targets' efforts than usual, targets reported higher autonomous motives than usual, and both partners also reported greater regulation success than typical. These results demonstrate that state-level, within-person fluctuations in agents' gratitude for change efforts are robustly accompanied by corresponding changes in targets' autonomous motives and regulation success. All results remained significant when independently controlling for each preregistered covariate (i.e., agents' communication strategies, general gratitude, and agents' general positivity in response to targets' change efforts; see supplement for control model statistics).

Within-Person Cross-Lagged Associations. Consistent with our hypotheses, when agents reported more gratitude for targets' change efforts during a given week than usual, targets reported greater regulation success than usual the following week (see Table 8). However, there were no significant longitudinal mediations observed at the within-person level. Still, this cross-lagged main effect should not be dismissed in light of the fact that within-person fluctuations across weekly intervals tend to be small, and this stringent modeling approach accounts for the extent to which these fluctuations persist over time (i.e., autoregressive effects) and are interrelated within-time. Furthermore, the consistent results across our control models demonstrate the robustness of the observed within-person associations (see supplement for control model statistics).

Table 7. Summary of Within-Person Concurrent Associations Among Agents' Gratitude for Change Efforts, Targets' Autonomous Motives, and Regulation Success.

Association	b
Agent gratitude (T-P.) ↔ Target autonomous motives	**.30*/.29*/.29*/.29***
Agent gratitude (A-R.) ↔ Target autonomous motives	**.10*/.09*/.08*/.09***
Agent gratitude (T-P.) ↔ Regulation success (T-R.)	**.64***
Agent gratitude (A-R.) ↔ Regulation success (T-R.)	**.31***
Agent gratitude (T-P.) ↔ Regulation success (A-P.)	**.35***
Agent gratitude (A-R.) ↔ Regulation success (A-P.)	**.76***
Target autonomous. ↔ Regulation success (T-R.)	**.33*/.32***
Target autonomous. ↔ Regulation success (A-P.)	**.16*/.16***

Note. Estimates are unstandardized. The table includes coefficients obtained from four separate models. Each model included one of two predictors (target-perceived agent gratitude or agent-reported gratitude), one of two outcomes (target-reported regulation success, agent-perceived regulation success), and a mediator (targets' autonomous motives). Multiple coefficients are listed as a range. A-R = Agent-reported; A-p = Agent-perceived; T-R = Target-reported; T-P = Target-perceived. * = $p < .05$. Significant effects are bolded.

Long-Term Association Analysis Plan

We then tested whether agents' gratitude for targets' change efforts at baseline could predict more successful change almost 9 months later. These analyses involved four multilevel models with participants nested within dyads and restricted maximum likelihood estimation. Intercepts were specified as random and slopes as fixed. All predictors (including mediator variables) were grand mean centered prior to analyses. All main effect analyses were conducted using SPSS Version 26.0. See Table 9 for zero-order correlations among key variables.

We then repeated all four models to test mediation—that is, whether agent gratitude for change efforts predicted later regulation success through targets' autonomous motivation across the weekly diary. We used the results of these models

Table 8. Summary of Within-Person Lagged Associations Among Agent's Gratitude for Change Efforts, Target's Autonomous Motives, and Regulation Success.

Association	b
Agent gratitude (T-P.) $_{T-I}$ → Target autonomous motives	−.01/.00/.01/.02
Agent gratitude (A-R.) $_{T-I}$ → Target autonomous motives	.04/.02/.03/.04
Agent gratitude (T-P.) $_{T-I}$ → Regulation success (T-R.)	−.03
Agent gratitude (A-R.) $_{T-I}$ → Regulation success (T-R.)	**.11***
Agent gratitude (T-P.) $_{T-I}$ → Regulation success (A-P.)	.01
Agent gratitude (A-R.) $_{T-I}$ → Regulation success (A-P.)	.06
Target autonomous motives $_{T-I}$ → Target regulation success (T-R.)	.03/.03
Target autonomous motives $_{T-I}$ → Target regulation success (A-P.)	.06/.06
Target autonomous motives $_{T-I}$ → Agent gratitude (T-P.)	.03/.01/.04/.04
Target autonomous motives $_{T-I}$ → Agent gratitude (A-R.)	.03/.04/.04/.04
Target regulation success. (T-R.) $_{T-I}$ → Agent gratitude (T-P.)	.03
Target regulation success. (T-R.) $_{T-I}$ → Agent gratitude (A-R.)	.08
Target regulation success. (A-P.) $_{T-I}$ → Agent gratitude (T-P.)	**.10***
Target regulation success. (A-P.) $_{T-I}$ → Agent gratitude (A-R.)	**.12***
Target regulation success. (T-R.) $_{T-I}$ → Target autonomous motives	.06/.04
Target regulation success. (A-P.) $_{T-I}$ → Target autonomous motives	.05/.03

Note. Estimates are unstandardized. The table includes coefficients obtained from four separate models. Each model included one of two predictors (target-perceived agent gratitude or agent-reported gratitude), one of two outcomes (target-reported regulation success, agent-perceived regulation success), and a mediator (targets' autonomous motives). Multiple coefficients are listed as a range. A-R = Agent-reported; A-*p* = Agent-perceived; T-*R* = Target-reported; T-P = Target-perceived. * = *p* < .05. Significant effects are bolded.

and the Monte Carlo Method for Assessing Mediation (MCMAM) to evaluate indirect effects with bootstrapped 95% confidence intervals based on 20,000 samples (Selig & Preacher, 2008). Confidence intervals that did not include zero were considered significant.

Multilevel Model Results for Long-Term Main Effect Associations

Targets' Perceptions of Agents' Gratitude. Consistent with our hypotheses, targets who perceived agents to be more grateful

Table 9. Zero-Order Correlations Among Study 2 Longitudinal Analysis Variables.

Variables	1	2	3	4	5
1. Target-perceived gratitude (baseline)	–				
2. Agent-reported gratitude (baseline)	.34**	–			
3. Target autonomous motives (weekly aggregate)	.32**	.23**	–		
4. Target-reported regulation success (follow-up)	.30**	.16*	.52**	–	
5. Agent-perceived regulation success (follow-up)	.27**	.19**	.21**	.45**	–

*p < .05, **p < .01.

for their efforts to change at baseline reported significantly greater autonomous motivation across the diary and greater regulation success approximately 9 months later (see Table 10 for all model statistics). Agents also perceived targets to be more successful at follow-up. These effects remained significant when controlling for prior regulation success at baseline or baseline autonomous motives.

Agents' Reports of Gratitude. Similarly, agents who reported being more grateful for targets' efforts at baseline had partners (i.e., targets) who reported being more autonomously motivated across the diary and these agents (but not the targets) reported more regulation success at follow-up (see Table 10 for all model statistics), even when controlling for baseline reports of regulation success. However, this indirect effect was not significant when controlling for baseline autonomous motives (see supplement for control model statistics).

Out of 39 main effect links tested in discriminatory analyses, 33 were still significant, with no consistent pattern of effects that became nonsignificant when controlling for any of our covariates (see the supplement for control model results). Thus, main effect results robustly persisted above and beyond communication of change requests and other positive agent behaviors and communication.

Multilevel Model Results for Long-Term Mediations

Consistent with our hypotheses, targets' greater autonomous motives across the diary mediated the links between both targets' perceptions and agents' reports of gratitude for change efforts at baseline and targets' (but not agents') reports of greater success at follow-up, and these links remained significant when controlling for baseline regulation success. In addition, the indirect effect of target-perceived gratitude on target-reported regulation success also remained significant when controlling for baseline autonomous motives (see

Table 10. Models of Agent Gratitude for Change Efforts Predicting Longitudinal Regulation Success in Study 2.

							95% CI	
Outcome	*b*	*SE*	*df*	*T*	*p*	*R²*	LL	UL
Target-perceived gratitude								
Target autonomous motives (weekly aggregate)	**.29**	.06	289.04	5.10	**<.001**	.082	.18	.41
Target-reported success (follow-up)	**.24**	.05	227.31	4.49	**<.001**	.081	.14	.35
Agent-perceived change success (follow-up)	**.20**	.06	234.09	3.31	**.001**	.045	.08	.32
Agent-reported gratitude								
Target autonomous motives (weekly aggregate)	**.22**	.07	293.21	2.98	**.003**	.029	.07	.36
Target-reported success (follow-up)	.13	.07	241.29	1.77	.079	.013	-.01	.27
Agent-perceived change success (follow-up)	**.19**	.08	239.72	2.57	**.011**	.027	.05	.34

Note. CI = confidence interval; *LL* = lower limit, *UL* = upper limit. Significant effects are bolded.

Table 11. Longitudinal Effects of Gratitude for Change Efforts on Study 2 Regulation Success Mediated by Autonomous Motives.

						95% CI of *ab*	
Outcome	*a*	*b*	*ab*	*c*	*c'*	LL	UL
Target-perceived gratitude							
Target-reported success (follow-up)	.29***	.39***	**.11**	.24***	.12*	**.06**	**.17**
Agent-perceived change success (follow-up)	.29***	.09	.03	.20**	.18**	−.01	.07
Agent-reported gratitude							
Target-reported success (follow-up)	.22**	.42***	**.09**	.13	.03	**.03**	**.16**
Agent-perceived change success (follow-up)	.22**	.10	.02	.19*	.18*	−.00	.06

Note. CI = confidence interval; *LL* = lower limit, *UL* = upper limit. Significant effects are bolded.
*p < .05, **p < .01, ***p <.00.

supplement for control model statistics). No other mediation models were significant (see Table 11).

Mediation results were also robust and remained significant when separately controlling for each covariate. The only exception was that the indirect link between greater agent-reported gratitude and greater target-reported regulation success through targets' greater autonomous motives became nonsignificant when controlling for targets' perceptions of agent general positivity for change efforts (see the supplement for control model statistics).

Discussion

Consistent with our prior studies, the weekly diary results demonstrated that within-person fluctuations in agent gratitude (both target-perceived and agent-reported) were robustly associated with intraindividual changes in target autonomous motives, and both partners' reports of regulation success. Furthermore, although we generally found weaker support for the cross-lagged within-person effects of agent gratitude in weekly intervals, the results also showed that when targets received more gratitude than usual from the agent, this led to subsequent increases in target-reported regulation success. Given the rigorous nature of the within-person analyses, the concurrent and lagged effects observed from the weekly diary component provide support for the idea that increases

in gratitude for change efforts are associated with corresponding increases in regulation success.

Analyses of longer-term associations demonstrated that targets who perceived agents to be more grateful for their efforts reported greater subsequent autonomous motives across the next 2 months, and greater regulation success another 6 months later. Furthermore, these results extended to agents, such that they also reported more regulation success over time. Testing our key predictor, mediator, and outcomes at separate time points allowed us to provide stronger support for our proposed direction of effects, especially because all regulation success findings remained significant when controlling for baseline regulation success. Notably, these longer-term effects were more consistent than weekly lagged effects, perhaps because they captured different types of effects (i.e., within-person effects isolated from more stable between-person effects) or a week may not have been long enough to capture perceptible variations in regulation success as a function of agent gratitude over time. However, main effect and mediation results were less consistent for agents' reports of their own gratitude and perceived regulation success, perhaps because agents may not always accurately detect targets' change efforts.

However, the results of this study are also correlational, and thus we cannot assert that greater agent gratitude causes more target autonomous motivation or change success. Other

factors, including the quality of agent gratitude expressions (e.g., how authentic they are) may also shape these associations. Thus, we conducted experimental work to test causal links between agent gratitude and change outcomes.

Study 3a

Despite the consistent and robust effects detected in previous studies, especially for target-perceived gratitude and target-reported regulation outcomes, these analyses were all correlational and cannot determine whether greater gratitude for change efforts causes greater autonomous motives or regulation success. We address this limitation in the following two experimental studies. In Study 3a, we focused on targeted partners and manipulated hypothetical agent responses to targeted partners' change efforts. Given that a pilot study (see supplement) revealed that general positivity was another common response to change efforts, we compared imagined agent gratitude to an imagined general positivity condition and a neutral control condition. We preregistered our study design, hypotheses, and analyses prior to data collection (https://osf.io/xzvyk/).

Method

Participants. We recruited 450 participants in romantic relationships online from Prolific Academic (see Table 2 for participant demographics). As per the preregistration, we replaced 72 participants (split roughly equally among conditions) who failed to recall what they were asked to imagine with new participants and removed 19 participants who failed to describe an aspect of themselves that their partner would like to change prior to analyses, resulting in a sample of 431. This sample size was determined by a priori power analyses using G*Power 3.1.9.2 (Faul et al., 2009) to ensure 80% power to detect a small effect size (f^2) of .017 with our preregistered analysis approach. However, we deviated from our preregistered analysis plan to conduct a more statistically appropriate test of our hypotheses (see the supplement for the original analyses, which demonstrate the same pattern of results), despite this new approach resulting in insufficient power to detect small effects. To be eligible for the study, participants needed to be at least 18 years old and to have been in their romantic relationship for at least 1 year.

Procedure. In an online survey, participants were asked to describe the number one aspect of themselves that their partner (i.e., the agent) would like them to change. Participants who previously tried to change (79.8%) were asked to describe their effort and participants who had not already made an effort to change (20.2%) were asked to describe something they could do to make this change. Participants were then randomly assigned to the imagined gratitude, imagined general positivity, or neutral control condition (see Table 12 for condition prompts). Finally, participants

completed measures of autonomous motives and current motivation to change. Participants were compensated at a rate of £5 per hour. This study was approved by the University of Toronto ethics board (protocol #37757).

Measures. All items were rated on a scale of 1 (*not at all*) to 7 (*extremely*).

Autonomous Motives Underlying Change Efforts. Targets' autonomous motives for changing were assessed with an average of the items: "Because I find making this change meaningful" and "Because I would feel good about myself if I made this change" ($M = 5.30$, $SD = 1.43$, $r = .71$).

Regulation Success. Participants' regulation success was operationalized in terms of overall motivation to change and was assessed with an average of the items "I feel motivated to change" and "I intend to keep making efforts to make this change" ($M = 5.10$, $SD = 1.40$, $r = .81$).

Results

Analytic Plan. Using SPSS Version 26.0, we tested the hypothesis that participants in the imagined gratitude condition (as compared to those in the imagined general positivity and neutral control conditions) would report greater autonomous motives and motivation to change by entering condition as the group identifier and comparing means across the three conditions via an analysis of variance (ANOVA). We then used Hayes PROCESS model 4 (Hayes & Preacher, 2014) to test for mediations of the link between condition and overall motivation to change through autonomous motives with bootstrapped 95% confidence intervals based on 20,000 samples. Confidence intervals that did not include 0 were considered significant. As is recommended for mediation with a multicategorical independent variable (i.e., the experimental conditions) (Hayes & Preacher, 2014), we computed an indicator variable for condition to compare participants in the gratitude and general positivity conditions and participants in the gratitude and neutral control conditions. The mediator was grand-mean-centered prior to analysis.

Main Effects. The overall ANOVAs were not significant ($ps > .11$) and thus, participants did not report significantly different levels of regulation success (i.e., motivation to change) or autonomous motives across groups. We did not conduct post hoc comparison tests (see Figure 2 and Table 12 for group means). However, given that participants were not asked to complete a manipulation check, we cannot know if our imagined gratitude manipulation was effective.

Mediations. Despite there being no significant main effects, we nevertheless proceeded to test for indirect effects through autonomous motivation, as per our preregistration. Indeed, target autonomous motives mediated the link between being in the imagined gratitude (vs. control) con-

dition and overall motivation to change, 95% confidence interval (CI) [.02, .48] (see Figure 3). However, this indirect effect was not significant when comparing the imagined gratitude and imagined general positivity conditions, 95% CI [−.11, .33]. Thus, participants in the hypothetical gratitude condition reported greater autonomous motives than participants in the control condition and, in turn, reported greater anticipated regulation success.
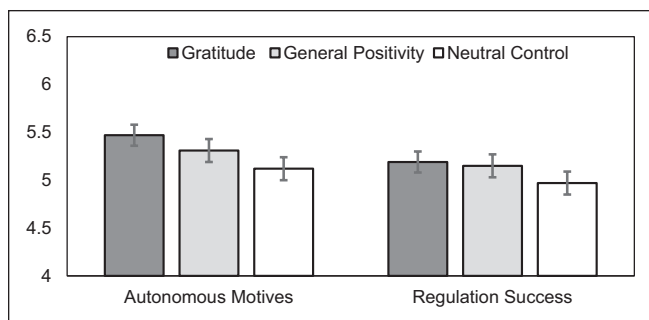
Although this study provided initial evidence of a causal indirect link between imagined gratitude and regulation success in the form of motivation to change, the lack of a main effect may be explained in part by our small sample and the fact that the imagined generally positive expression (see Table 12) may also have been interpreted as an expression of

Figure 2 *Means of Study 3a Dependent Measures Across Conditions*
Note. Error bars are standard errors of the mean.

gratitude given "That's awesome!" represents a positive response to targets' costly prosocial behavior. We could not assess whether this was the case with a manipulation check. Accordingly, we conducted a second experiment (Study 3b) with sufficient power to detect group differences and to examine how grateful the imagined responses were perceived to be.

Study 3b

We again focused on targeted partners and manipulated hypothetical agent responses to change efforts. Given that it was unclear from Study 3a whether participants might also perceive gratitude from the imagined response "That's awesome!," we included this general positivity condition again only to examine how grateful it was perceived to be, given that it may not have been an effective comparison to gratitude due to its potential to also infer gratitude.

We had two main conditions in which we compared key outcomes and again assessed perceived gratitude. In the gratitude condition, participants were asked to imagine and describe the agent (i.e., their partner) saying something to them that expressed gratitude for their efforts (vs. imagining a particular sentence to increase believability). As a stringent test of whether imagined gratitude promotes autonomous motivation, we included a condition in which participants imagined their partners directly providing autonomy support. Autonomy support involves encouraging people to make their own choices and has been linked to autonomous

Table 12 Study 3a Condition Prompts and Descriptive Statistics

			Autonomous motives		Regulation success	
Condition	Prompt	N	M	SE	M	SE
Gratitude	Participants were asked to imagine that their partner expressed gratitude toward them for their effort. They saw the prompt: People often express gratitude when their romantic partner tries to make the changes they requested. Please take some time to imagine the following: After you made the efforts to change that you've just described, your partner says: "Thank you, I appreciate it!" Please wait for the next arrow to appear.	137	5.47	0.12	5.19	0.11
General positivity	Participants were asked to imagine that their partner responded to them with a generally positive comment about their effort. They saw the prompt: People are often encouraging when their partner tries to make the changes they requested. Please take some time to imagine the following: After you made the efforts to change that you've just described, your partner says, "That's awesome!" Please wait for the next arrow to appear.	153	5.31	0.11	5.15	0.12
Neutral control	Please wait until the next arrow appears. Please click the arrow to continue.	141	5.12	0.13	4.97	0.12
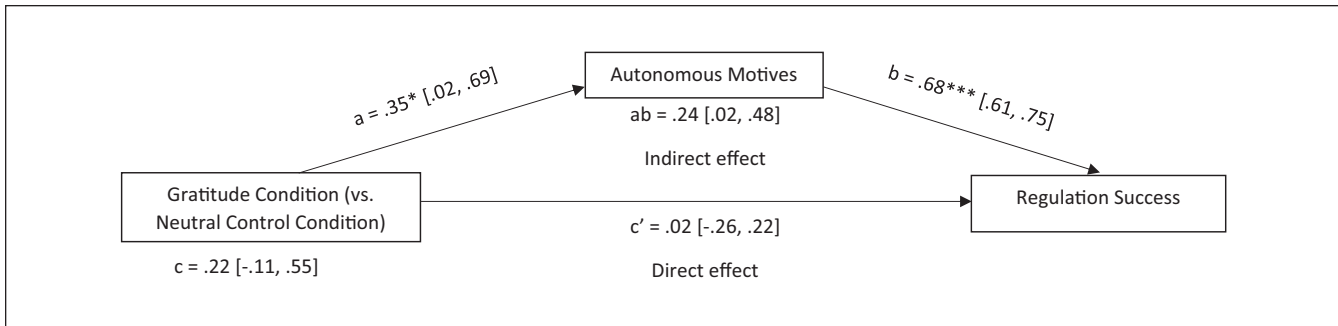
Figure 3. *Associations Between Condition (Gratitude vs. Neutral Control) and Regulation Success Mediated by Autonomous Motives in Study 3a*
Note. All reported coefficients are unstandardized.
*p < .05, **p < .01, ***p < .001.

motivation and successful behavioral change (e.g., quitting smoking; Williams et al., 2002), even for goals being pursued for someone else (e.g., parents, partners; Carbonneau & Milyavskaya, 2017; Koestner et al., 2012; Rochette et al., 2022). Thus, although less common as a positive response to change efforts compared to gratitude (see supplement for pilot study about responses to change efforts), we considered it a promising candidate with which we can compare the effects of gratitude on autonomous motivation. We preregistered our study design, hypotheses, and analyses prior to data collection (https://osf.io/xzvyk/).

Method

Participants. We recruited 725 romantically involved individuals from Amazon's Mechanical Turk with integrated CloudResearch, which allows for better data quality control and more representative samples than Mechanical Turk alone (Litman et al., 2017) (see Table 2 for participant demographics). An additional 108 participants began the survey, but 24 responses were removed for failing our attention check, failing to report a partner-requested change, or failing to report a prior/potential change effort, as per our preregistration. We also removed 49 participants who indicated that their partner would not actually say the response they had imagined and 35 participants who described a response that was not consistent with the assigned condition (e.g., their partner responding with sarcasm), given that any manipulation would likely be ineffective for these participants, resulting in the final sample of 725.

Procedure. Participants were first asked to describe the aspect of themselves that their partner would most like them to change. Participants who previously tried to change (85.1%) were asked to describe their effort and participants who had not already tried to change (14.9%) were asked to describe something that they could do to make this change. Participants were then randomly assigned to one of three conditions, with a predetermined 20% chance of being assigned to the imagined general positivity condition, and a 40% chance

of being assigned to either the imagined gratitude or imagined autonomy support conditions. Based on a priori power analyses with G*Power (Faul et al., 2009), we aimed to recruit at least 275 participants in both the gratitude and autonomy support conditions to provide us with 90% power to detect small to medium effects (*d* = .25) between these main comparison groups. See Table 13 for condition prompts and descriptive statistics. Participants in the gratitude and autonomy support conditions were then asked to describe what they had imagined their partner saying. Finally, all participants completed a manipulation check and assessments of autonomous motives and regulation success (i.e., current motivation and anticipated success). Participants then received $1 in compensation. This study was approved by the University of Toronto ethics board (protocol #37757).

Measures. All items were assessed on a 1 (*not at all*) to 7 (*extremely*) scale.

Manipulation Check. To assess how much gratitude was inferred from each imagined response, participants completed the item "How grateful would you think your partner was if they said what you just imagined them saying to you?" (*M* = 5.47, *SD* = 1.36).

Autonomous Motives.. Participants were asked "To what extent would you make an effort to change for each of the following reasons?" Then, participants reported the extent to which they would make future efforts for autonomous reasons with an average of three items, including those from Study 3a and the item "Because making progress at this change is satisfying for me" (*M* = 5.48, *SD* = 1.20, α = .86).

Regulation Success.. Participants' anticipated regulation success was assessed with an average of the items: "I feel motivated to make this change," "I intend to keep making efforts to make this change," and "I think that I will be successful at making this change" (*M* = 5.51, *SD* = 1.20, α = .90).

Table 13. Study 3b Condition Prompts and Descriptive Statistics.

|			Autonomous motives		Regulation success	
Condition	Prompt	N	M	SE	M	SE
Gratitude	Participants were asked to imagine that their partner expressed gratitude toward them for their effort. They saw the prompt: When people try to make a change that their partner wants them to make, their partner often expresses *gratitude*. Imagine that you have just made the effort to change that you previously described. Imagine that after making this effort, your partner says something to you *that makes you feel like they are grateful for your effort.*	281	5.60	0.07	5.64	0.07
Autonomy support	Participants were asked to imagine that their partner expressed support toward them for their effort. They saw the prompt: When people try to make a change that their partner wants them to make, their partner often expresses *support*. Imagine that you have just made the effort to change that you previously described. Imagine that after making this effort, your partner says something to you *to assure you that it is your choice whether to make the change or not.*	289	5.34	0.08	5.42	0.07
General positivity	Participants were asked to imagine that their partner responded to them with a generally positive comment about their effort. They saw the same prompt as in Study 3a.	155	5.52	0.09	5.44	0.09

Results

All analyses were conducted using SPSS Version 26.0.

Manipulation Check. An independent samples t-test revealed that participants in the gratitude condition perceived the response they imagined their partner saying as expressing significantly more gratitude ($M = 5.93$, $SD = 0.99$) than those in the imagined autonomy support condition ($M = 4.97$, $SD = 1.53$), $t(568) = 8.92$, $p < .001$, Cohen's $d = .74$, indicating that our manipulation was effective. We expected that participants in the gratitude and the general positivity conditions would report inferring similar amounts of gratitude, but participants in the gratitude condition also reported inferring significantly more gratitude than those in the general positivity condition ($M = 5.54$, $SD = 1.29$), $t(434) = 3.27$, $p = .001$, Cohen's $d = .34$. However, participants still perceived a high level of gratitude from the hypothetical generally positive response, which may explain why participants who received this potentially vaguer expression of gratitude in Study 3a reported similar levels of outcomes to those in the gratitude condition.

Main Effects. We conducted two additional independent samples *t*-tests comparing means of autonomous motives and regulation success in the imagined gratitude and autonomy support conditions. As expected, participants in the
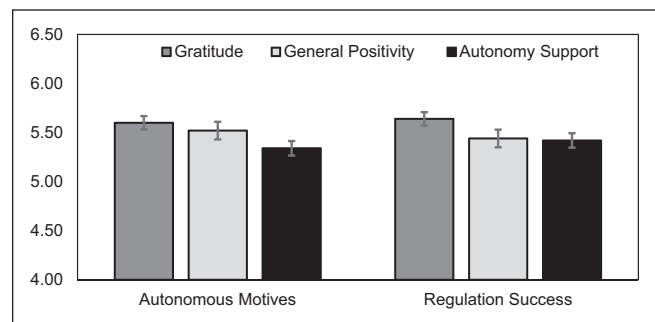

Figure 4. Means of Study 3b Dependent Measures Across Conditions.
Note. Error bars are standard errors of the mean.

imagined gratitude condition reported significantly greater anticipated regulation success than those in the imagined autonomy support condition, $t(568) = 2.19$, $p = .029$, Cohen's $d = .18$, and significantly greater autonomous motives than those in the autonomy support condition, $t(568) = 2.62$, $p = .009$, Cohen's $d = .21$ (see Figure 4 for group means).

Mediations. We then used the same procedure as in Study 3a to test for mediation through autonomous motives. As expected, autonomous motives mediated the link between condition (gratitude vs. autonomy support) and anticipated
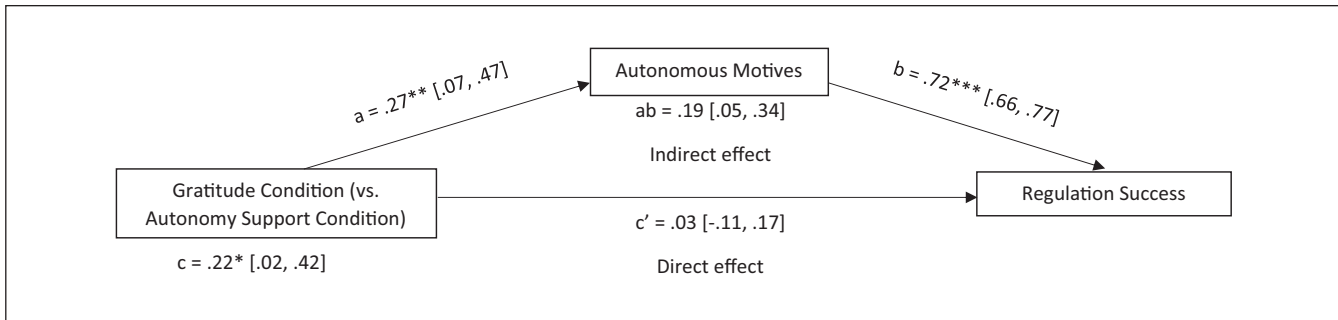
Figure 5. Associations Between Condition (Gratitude vs. Autonomy Support) and Regulation Success Mediated by Autonomous Motives in Study 3b.
Note. All reported coefficients are unstandardized.
*$p < .05$, **$p < .01$, ***$p < .001$.

regulation success, such that participants in the imagined gratitude condition reported greater autonomous motives than those in the imagined autonomy support condition and, in turn, more anticipated regulation success, 95% CI [.05, .34] (see Figure 5). Thus, when targets imagined their partner responding to their change effort with gratitude, they reported being more motivated to keep changing and anticipated being more successful than those who imagined their partner supporting their autonomy, through greater autonomous motivation.

Discussion

Overall, Studies 3a and 3b provided stronger causal evidence for our hypotheses by including manipulated hypothetical gratitude expressions. We found support for our mediation hypothesis in both studies, and main effect hypothesis in Study 3b with an improved gratitude condition and comparison positive response (i.e., autonomy support) condition. However, despite the strengths of this experimental approach, it is not clear from these studies whether these effects would extend to real (vs. imagined) gratitude responses or whether the manipulation check suggested that the gratitude manipulation was effective due to demand characteristics, given that we explicitly instructed participants to imagine their partner expressing gratitude. These limitations may be addressed in further work examining manipulations of actual gratitude expressions in couple interactions.

General Discussion

In this work, we examined whether agent gratitude in response to change efforts could promote more target autonomous motives for changing (i.e., attempting to change because it is a personally fulfilling and valued pursuit) and, in turn, facilitate more regulation success. Study 1—an in-lab dyadic study—showed that target-perceived and agent-reported gratitude for change efforts were linked to generally greater anticipated regulation success reported

by targets and agents, but the link between agent-reported gratitude and target-anticipated success was not significant. According to agents, this also translated into greater regulation success 2 weeks later. Within-person results from Study 2—a preregistered dyadic longitudinal study—demonstrated that targets who perceived or received (as reported by agents) more gratitude for change efforts during a given week also reported greater autonomous motives, and both targets and agents reported greater regulation success. For agent-reported gratitude, this also translated into greater target-reported regulation success the following week.

Despite within-person fluctuations in gratitude for change efforts, target autonomous motivation, and both partners' reports of regulation success being significantly associated with each other within the same time point, deviations from typical perceived or received gratitude largely did not predict subsequent changes in regulation success the following week. However, given the long-term nature of partner-requested change and personality change in general (Hudson & Fraley, 2015), 1 week may not have been enough time to detect perceivable progress toward the requested change. As such, our stringent long-term analyses of follow-up outcomes demonstrating significant links between agents' gratitude, future autonomous motives, and change success 9 months later may have been a closer to optimal test of the potential benefits of gratitude for autonomous motivation and change success.

Finally, in two preregistered experiments (Studies 3a and 3b), we manipulated hypothetical agent responses to change efforts and compared gratitude to other positive/supportive responses. Study 3a results did not support our main effect hypothesis most likely because limitations of the study design (i.e., the small sample size and a general positivity condition which we discovered also evoked perceived gratitude in Study 3b) did not allow us to fully interpret the data. Study 3b results demonstrated that imagining a partners' gratitude in response to change efforts promoted more expectation of regulation success as compared to imagining a

positive response (i.e., autonomy support) that has been shown to elicit regulation success in other contexts (Rochette et al., 2022; Williams et al., 2002). Furthermore, both experiments provided causal evidence for our mediation hypotheses, such that imagined agent gratitude (as compared to a neutral control condition in Study 3a and as compared to imagined autonomy support in Study 3b) was indirectly linked to greater target-reported motivation and anticipated regulation success through targets' greater autonomous motives.

Overall, target-perceptions of agent gratitude were linked to greater autonomous motives in every test of this hypothesis, except for Study 3a, and greater target-reported anticipated success/motivation to change (Studies 1, 3a, 3b) and actual regulation success (Study 2). Furthermore, links between target-perceived gratitude and target-reported regulation outcomes were consistently mediated by greater target autonomous motivation. Although less consistently, agent-reported gratitude was also linked to greater target autonomous motives (Study 2) and greater agent-reported anticipated (Study 1) and actual (Studies 1 and 2) regulation success, as well as target-reported actual success (Study 2). In line with work suggesting greater relationship benefits when gratitude is accurately detected but also the tendency for partners to underestimate each other's gratitude (Tissera et al., 2023), these results suggest targets may need to perceive agent gratitude to reap the most benefits for autonomous motivation and regulation success.

Implications

The present findings highlight the need for a broader model of partner regulation (i.e., beyond current models which focus on change requests) that considers how agents respond to targets' change efforts. Specifically, the results consistently demonstrate the benefits of responding positively to targets' change efforts with gratitude for promoting the optimal kind of motivation (i.e., autonomous motives) for pursuing potentially challenging goals like partner-requested changes. These findings are in line with insights from both partner regulation and goal achievement literatures that highlight the difficulty and likely long-term nature of successfully achieving requested changes in traits and behaviors (e.g., Overall et al., 2009). The findings also demonstrate another context in which positive feedback in general (e.g., Fishbach et al., 2010) and gratitude in particular (e.g., Kindt et al., 2017) can motivate prosocial behavior by signaling that one's efforts have been valued by the recipient. As such, this research applies cybernetic models of goal achievement (see Milyavskaya & Werner, 2018 for a review) in a novel way to address how agents can optimally respond to targets' change efforts.

Notably, our control analyses (a) demonstrate the unique benefits of gratitude in response to change efforts above and beyond how agents initially communicate change requests which have been the focus in the literature, (b) demonstrate the unique benefits of gratitude for change efforts in particular, as opposed to both gratitude expressed by agents in general and other positive agent responses (e.g., imagined autonomy support), and (c) provide further causal evidence by controlling for baseline regulation success (in Study 2) and using experimental manipulations (in Studies 3a and 3b). Results across studies generally remained significant when accounting for each variable among these theoretically relevant controls.

In addition, our work adds to the broader literature on interpersonal goal pursuit (e.g., the Michelangelo Phenomenon; see Rusbult et al., 2009 for a review), which also highlights the importance of agent support and target motivation for successful goal pursuit. Specifically, by highlighting ways in which a partner requesting change can support the target to inspire autonomous motivation and successful goal pursuit, the current research suggests that partner regulation may help partner-requested goals become *shared* goals. At this stage, agent support may shift to include responsive goal support (e.g., Feeney, 2004) and behavior that affirms targets' perceptions of their changed identity, which has been robustly linked to better personal and relational well-being (Rusbult et al., 2009). Thus, partner regulation and shared goal pursuit may complement each other.

Strengths, Limitations, and Future Directions

The present research provided a rigorous test of our hypotheses through a multimethod package of dyadic (in-lab, within-person, longitudinal) and individual (experimental) analyses and allowed us to capture immediate and long-term outcomes across many contexts (i.e., in a controlled lab setting, in everyday life, and in hypothetical scenarios). This multimethod examination also allowed us to establish both correlational and causal evidence for our proposed main effects and mediations, while accounting for relevant covariates.

The present findings included participants recruited from a variety of locations (i.e., Canada, the United States, and the United Kingdom) and sources (e.g., local communities, CloudResearch) and diverse sociodemographic backgrounds (e.g., ages, ethnic/racial identities, socioeconomic statuses). However, these results still primarily represent the experiences of White, Western, and heterosexual partnered people, in relatively high-quality relationships (see Table 2). Future research should examine partner regulation in more diverse samples and relationships.

The present research presents a crucial shift in partner regulation research which integrates goal achievement theory to understand how gratitude—as feedback throughout the change process—might promote greater change success through promoting autonomous motivation, suggesting that partner regulation research could further benefit from a theoretical model that examines both change initiation (i.e.,

communication about change requests) and feedback about change progress (i.e., gratitude). There may be positive cycles of change initiation and feedback such that direct communication of a change request is necessary to promote initial change efforts (e.g., Overall et al., 2009), but—in line with theory about goal achievement (e.g., Carver & Scheier, 2012)—must be complemented with ongoing communication that recognizes and values targets' progress. Such positive feedback could facilitate further direct discussion about desired change and positive feedback in response to further effort. Thus, gratitude in response to change efforts and direct change requests may promote an upward spiral toward better change outcomes.

Declaration of Conflicting Interests

Funding

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Data Availability Material

Code, data, and materials for all studies (and preregistrations for Studies 2-3b) are accessible on the Open Science Framework at: https://osf.io/xzvyk/, except for open-ended data and demographic data which have been removed to protect participants' anonymity and are available upon request.

Supplemental Material

Supplemental material is available online with this article.

Notes

1. Given that both receiving expressions of gratitude (Park et al., 2021) and successful partner change (Overall et al., 2006) are linked to greater relationship satisfaction, we tested relationship satisfaction as a preregistered outcome in Studies 2 to 3a (see supplement for relationship satisfaction results).
2. In our preliminary online study ($N = 486$ partnered individuals), we found cross-sectional evidence for direct and indirect links between agents' gratitude and regulation success. Greater perceptions of agent gratitude for previous change efforts were associated with significantly greater regulation success and this link was mediated by greater autonomous motives (see supplement for a description of this sample, analytic strategy, and results). However, given the limitations of testing mediations

in cross-sectional data (e.g., Bullock et al., 2010), we conducted Study 2 to provide a more rigorous test of our mediation hypothesis.

3. This power analysis accounts for the two-level, nested structure of the data, but does not account for the cross-classification specified in the models used to test our hypotheses.
4. Some participants completed at least one weekly questionnaire more than once (e.g., due to technical issues). Seven duplicate responses were removed prior to analyses (retaining the completed entry, or the first completed entry in the case of multiple completed entries).

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