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Toward a Science of Relationship Forecasting: Considerations and Recommendations

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Given the importance of high-quality romantic relationships for health and well-being, researchers have spent decades examining factors that promote them. In doing so, they have identified factors that influence the formation and maintenance of relationships on average, in the moment, and for certain populations. However, making more targeted predictions for particular groups of people or even specific couples—with a meaningful degree of accuracy—remains challenging. We argue that the field is now at a pivotal moment, as technological advances are transforming what is possible. Drawing an analogy to weather forecasting, we suggest that relationship scientists can now gather the kind of data that would be necessary to try to truly map and model relationships as dynamic, complex systems and possibly even "forecast" relationship outcomes. In Part I, we consider the types of data needed to build these targeted predictive models, including dyadic data across timescales (micromoments to lifespans) that are embedded within contexts. We also highlight the need to incorporate heterogeneity in both data collection and analyses. In Part II, we posit that building these models will require the field to embrace interdisciplinary collaborations, leverage tools such as smartphones and artificial intelligence, and reevaluate long-standing assumptions about romantic relationships. While we cannot say with certainty whether more accurate, targeted relationship forecasts are possible, we believe that pursuing them is a worthwhile scientific venture—one that will help direct the field of relationship science regardless of what we find.

Public Significance Statement

Romantic relationships play a critical role in shaping health and well-being, yet scientists still struggle to make accurate, targeted predictions about how relationships will unfold over time. This article uses the analogy of weather forecasting to provide considerations and recommendations for how relationship science can move toward mapping and modeling relationships as complex, dynamic systems, with the goal of making more accurate predictions about relationships. By doing so, relationship scientists will gain new insights into the predictability of relationships. Exploring whether relationship scientists can "forecast" relationship outcomes, such as if two people will form a relationship or how long they will maintain that relationship, will have important theoretical and practical implications, allowing for broad advances in the field of relationship science.

Keywords: romantic relationships, relationship quality, idiographic models, longitudinal

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continued

> The surprising finding is that our relationships and how happy we are in our relationships has a powerful influence on our health. … Taking care of your body is important, but tending to your relationships is a form of self-care too. That, I think, is the revelation.
>
> Robert Waldinger in the *Harvard Gazette*

Robert Waldinger, director of one of the world's longest studies of adult life, was surprised by a central finding from the study: Social relationships are among the strongest predictors of human health and happiness (Waldinger & Schulz, 2023). For relationship scientists, however, this finding fits squarely with what we already know—close relationships play a pivotal role in shaping health and well-being. Moreover, what matters is not just the presence or absence of close relationships but their quality. Supportive relationships are strongly associated with physical health, including reduced mortality (Holt-Lunstad et al., 2010; House et al., 1988; Umberson et al., 2010) and better well-being (Diener & Seligman, 2002; Waldinger & Schulz, 2023). Romantic relationships, in particular, carry unique weight in adulthood. The dissolution of romantic relationships is often costly not only to psychological well-being but also to physical health and financial stability for individuals, families, and society (Amato, 2000; Mortelmans, 2020).

Given their importance and prevalence, relationship scientists have long searched for factors that contribute to high-quality romantic relationships. Doing so has yielded valuable insights into some of the factors that influence the formation and maintenance of these relationships on average, in the moment, and for certain populations. However, relationship scientists have not yet cracked the code on making more localized, targeted predictions—for example, for specific groups of people or even individual couples. For instance, we cannot accurately predict whether two particular people will be attracted to each other when they meet, whether a specific relationship will form—or be high quality when it does—and whether (or when) that relationship will end, with previous work failing to identify individual differences that meaningfully predict these outcomes (e.g., Joel et al., 2017, 2020; Karney & Bradbury, 1995). Here, we suggest that technological advances have now enabled researchers to collect and model the kinds of data needed to better address these more targeted questions and that doing so represents the next hurdle in relationship science.

Weather Forecasting as an Analogy for Relationship "Forecasting"

In 1938, one of the fastest moving hurricanes in U.S. history struck New England with little to no advance notice. Many residents learned of the danger only as it arrived, and communities were devastated. The storm became one of the deadliest and most destructive in the nation's history. This might seem difficult to imagine today: With modern weather forecasting, such a storm would be detected and tracked days in advance, allowing warnings to be issued well before landfall. Although certainly not perfect, modern weather forecasting can provide reasonably accurate, localized probabilistic predictions several days in advance. Extreme weather events (e.g., hurricanes) can often be anticipated a week or more ahead and broader climate patterns (e.g., El Niño) months in advance. However, this level of forecasting skill is a relatively recent achievement. Systematic weather observations and large-scale numerical predictive modeling only began in the mid-20th century, with predictive accuracy improving dramatically over the past 75 years (Bauer et al., 2015).

We believe that weather forecasting provides an apt analogy for thinking about the concepts, methods, and analyses needed for relationship science to move from population-averaged explanatory models to more targeted predictive models. Like relationships, weather is a complex, dynamic system. In addition, weather, like relationships, is subject to chaos—minor perturbations in initial conditions of the system create vastly different outcomes down the road (Galovan et al., 2017; Kalnay, 2002). However, atmospheric science has still been able to collect the data needed to map and model the atmosphere with an impressive degree of accuracy. Moreover, instead of simply understanding the factors that influence the weather, meteorologists regularly apply that knowledge to produce localized weather forecasts with practical utility.

What if relationship scientists could take a similar step? That is, what if they could gather the kinds of intensive and context-sensitive data needed to truly model relationships as the dynamic, complex systems they are. We may then be able to use those data to develop more localized predictive models that forecast outcomes like initial attraction or patterns of relationship quality that are specific to a particular group (e.g., couples with certain demographic characteristics or in a particular set of circumstances) or maybe even an individual couple. Here, we use *forecast* in the scientific sense—predictions, both short and long term, intended to be systematically evaluated against actual outcomes and refined over time. In meteorology, "weather" refers to short-term, localized conditions, whereas "climate" reflects long-term statistical patterns; in relationships, moment-to-moment dynamics resemble weather, whereas enduring patterns and trajectories are more like climate. Our use of forecast

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encompasses both timescales, reflecting the goal of building targeted predictive models that consider both immediate and long-term relational experiences.

If we want to shift our methodological approaches to include the goal of making more targeted relationship "forecasts," relationship scientists must attend carefully to different aspects of forecasting. For example, weather forecasting relies on information about current and longer range atmospheric patterns (e.g., seasonal effects; Kalnay, 2002). Similarly, building more localized predictive models for relationships will require attending to both the current relationship state and longer-term relationship patterns. In addition, useful weather forecasts focus on specific local regions and account for both the local landscape and the surrounding topography. Localized relationship models will similarly require relationship scientists to consider the immediate and broader contexts in which each relationship is embedded. Weather forecasting accuracy also varies. For example, geographical regions differ in their predictability, something many of us discovered after moving to Michigan, where they say, "If you don't like the weather, wait 5 min" (and they are not wrong). Similarly, relationship scientists may discover that some relationships—and relationship processes—are more predictable than others.

Of course, there are important limits to the weather forecasting analogy. Weather systems, while complex, operate according to physical laws that are more straightforward to model than the processes underlying romantic relationship formation and maintenance. Moreover, cultural forces—such as norms around dating, marriage, and divorce—shape relationship trajectories and have no true analogue in meteorology. Relationships can also be abruptly altered by acute, unforeseen events—like a sudden illness or death—that are difficult or impossible to anticipate. As a result, predictive models will likely be most accurate for relationships without such rare, disruptive events or may require distinct strategies to account for them. We must also consider that, unlike the weather, relationships may be directly impacted by prediction. If relationship predictions are shared with the targets of the prediction, they could be considered an intervention in and of themselves: People's reactions—and any resulting influences on their relationships—would need to be tracked and somehow incorporated back into the predictive models, adding a new layer of complexity.

When thinking about the kinds of relationship forecasts researchers might be interested in making, we envision that researchers will likely focus on questions they are already asking but which are currently unanswered. For example, how much will two people uniquely like each other when they first meet? Or how satisfied will someone be with their relationship a month or two down the road? Bolder forecasts—like forecasting the whole life cycle of a relationship for two people who have just gotten acquainted—seem outside the realm of possibility, at least for now (and such forecasts carry ethical considerations, as well). What we hope to highlight in this article is that, with the tools now available to us, relationship scientists are well-positioned to gather unprecedented data that will allow us to test whether we can accurately answer some of our longest standing questions in more targeted ways. We are at a pivotal moment when technological advances are actively transforming the kinds of data we can collect and the kinds of analyses we can conduct in relationship science. Like the start of more accurate weather forecasting in the mid-20th century, we believe it is now possible for relationship scientists to begin putting relationship forecasting to the test.

Relationship Forecasting Is a Worthwhile Scientific Venture

To be clear, we are not certain whether meaningful relationship forecasts are possible. Forecasting the future of relationship forecasting is not our goal. Rather, regardless of what is found, we think the endeavor of building targeted predictive models is scientifically worthwhile for three primary reasons. First, relationship science has mainly been an explanatory science—focused on testing theories that try to explain underlying relational processes—yet there is still so much we are not able to explain. Moving toward a more predictive science and collecting the data necessary to test whether accurate relationship forecasting is even possible is critical for informing the future of relationship science. Some systems—especially those involving human behavior—may prove too complex, dynamic, or context dependent to allow for meaningful, accurate prediction. However, we will not know the limits of our science until we try. With rich, intensive data now within reach, we can begin to ask: How good are the best predictive models? How much variance in relationship processes can we realistically hope to explain? How far into the future can we forecast? These are empirical questions, and addressing them with the right data will help clarify both the promise and boundaries of a predictive science of relationships.

Second, our focus in this article is bottom up—considering what is needed to build more targeted predictive models. However, we believe that trying to accurately map and model relationships as complex systems and build targeted predictive models will also have important theoretical implications. This approach will allow us to (a) test, compare, and clarify existing theories and (b) facilitate the generation of new ones. While descriptive work certainly exists, relationship science to date has been largely top down, with theoretical models (e.g., attachment theory, Hazan & Shaver, 1987; interdependence theory, Kelley & Thibaut, 1978) typically driving data collection and analysis. Relationship theories have guided the field by offering valuable explanatory power and providing critical insights into our understanding of relational processes. However, these theories are often tested

independently from each other and still leave much variability in relationships unexplained. Like ensemble weather forecasts, relationship scientists might find greater predictive accuracy by building targeted predictions that simultaneously test multiple theoretical models. This integrative approach may also yield greater theoretical insights by pinpointing where different existing theories converge and which theories explain the most variance. This approach could also facilitate better metatheories that address relationships across their entire lifespan (Eastwick et al., 2019). Incorporating more bottom-up methods into relationship science will also promote the generation of new theories based on observed patterns that cannot be explained by current theoretical frameworks.

Finally, regardless of what relationship scientists ultimately find, exploring the accuracy of relationship forecasting will help shed light on future directions for the field. For instance, if—even with rich, intensive data—there is no evidence that certain combinations of individual differences (e.g., traits, demographics) predict greater initial attraction, this strongly suggests that romantic chemistry and liking is emergent rather than predetermined by individual differences. In this case, relationship scientists studying attraction and relationship formation would be best served by focusing on dynamic, interactive, and contextual factors (e.g., identifying situational factors that foster compatibility and chemistry), as some relationship scientists have already suggested (e.g., Eastwick et al., 2023; Karney & Bradbury, 2005; Weigel & Murray, 2000). On the other hand, if researchers can accurately predict whether certain types of people, or even two specific individuals, are more likely to be attracted to each other, then relationship scientists might consider developing scientifically-based matching algorithms, especially given the prevalence of algorithm-based dating apps in the market. In short, knowing whether we can forecast relationships is valuable information for guiding the next era of exploration and intervention in relationship science.

Considerations and Recommendations for the Science of Relationship Forecasting

We want to take a moment to acknowledge that many of the points we make in this article are not new (although our weather analogy might be). We are not the first, for example, to discuss couple-specific models, idiographic approaches to relationships, or mapping relationship trajectories over time (e.g., Conroy-Beam et al., 2023; Eastwick et al., 2019; Galovan et al., 2023; Joiner et al., 2024). Our goal is to integrate these ideas and to carefully consider what steps would be necessary for relationship science to broadly adopt this approach. In doing so, we hope to inspire other relationship scientists to consider the transformative potential of putting relationship forecasting to the test.

Now, what steps are needed for relationship scientists to map and model relationships as complex systems and build more targeted predictive models? In Part I, we consider the types of data needed to build targeted predictive models, from dyadic to lifespan to contextual data. In Part II, we turn to the practical question: How can this actually be done? That is, how might we actually collect the necessary data and build models capable of forecasting relationships? In the space of this article, we cannot provide all the answers for how to do this; indeed, the field itself does not yet have all the answers. Instead, we see this article as a chance to encourage relationship scientists to join us in thinking seriously about the exciting opportunities and increasingly possible practicalities of relationship forecasting.

Part I: What Data Would We Need to Forecast Relationships?

In considering what data are necessary to successfully build targeted predictive models, we first suggest that capturing processes at the level of the dyad as well as at the level of individuals will be essential. Then, we suggest gathering data that examine the micromoments that make up relationships as well as how these moments accumulate to create patterns across a relationship and ultimately across a lifespan. Next, we outline the contextual data needed to understand and predict individual relationships, from sociocultural factors to the physical environment (both outside and inside the body). Finally, we suggest that greater attention be paid to heterogeneity in both data collection and data analysis efforts.

Centering the Dyad

Relationship science has made remarkable progress over the past few decades by collecting and analyzing data from both partners. While this is common now, it was not always the case (Kenny, 1995). This shift was driven, in part, by methodologists who articulated the conceptual importance of dyadic data and developed the necessary analytic tools (e.g., Gonzalez & Griffin, 1997; for a review, see Iida et al., 2023). Still, most dyadic approaches remain focused on individuals in relation to one another rather than treating the dyad itself as the unit of analysis (Galovan et al., 2017). To build targeted predictive models, embracing a truly dyadic perspective—one that centers the couple as a system in and of itself—may be essential.

The widespread use of the actor–partner interdependence model over the past few decades (Iida et al., 2023) highlights the primacy of the individual-level focus. Although the actor–partner interdependence model incorporates data from both partners and accounts for their interdependence, variables are measured and modeled at the level of the individual. To better align methods with the inherently dyadic nature of many relational phenomena, the field might benefit from broader adoption of models specifically designed to capture

dyadic processes—such as the common fate model and the dyadic score model (Galovan et al., 2017; Iida et al., 2018, 2023; Ledermann & Kenny, 2012). Continuing to make progress on understanding dyadic processes will require pushing even further into methods and measures that are truly interpersonal at their core.

This shift also means paying greater empirical and theoretical attention to processes that are inherently dyadic—those that emerge between partners through interaction and that cannot be reduced to individual experiences. Relationships are dynamic, self-organizing systems in which partners adapt to one another in real time (Felmlee & Greenberg, 1999). This gives rise to patterns like behavioral synchrony (Vacharkulksemsuk & Fredrickson, 2012), neural alignment (Kinreich et al., 2017), and shared laughter (Kurtz & Algoe, 2017)—experiences that reflect properties of the relationship (or interaction) itself, not of either partner alone. Over time, these moment-to-moment dynamics can accumulate into shared routines, rituals, and inside jokes that form a couple's unique microculture. Persistent difficulties in predicting relationship trajectories may stem, in part, from an overreliance on individual-level features of interactions, at the expense of these dynamic, coconstructed processes that uniquely define each relationship (A. M. Gordon & Diamond, 2023). Indeed, trying to understand relationships at the level of the individual, even when statistically accounting for interdependence, is like trying to predict a storm using barometric pressure from a single observation—every once in a while it may be accurate, but overall it misses the bigger system-level interactions that explain how these dynamics actually unfold (Hintz et al., 2019).

Capturing Relationship Dynamics Across Timescales

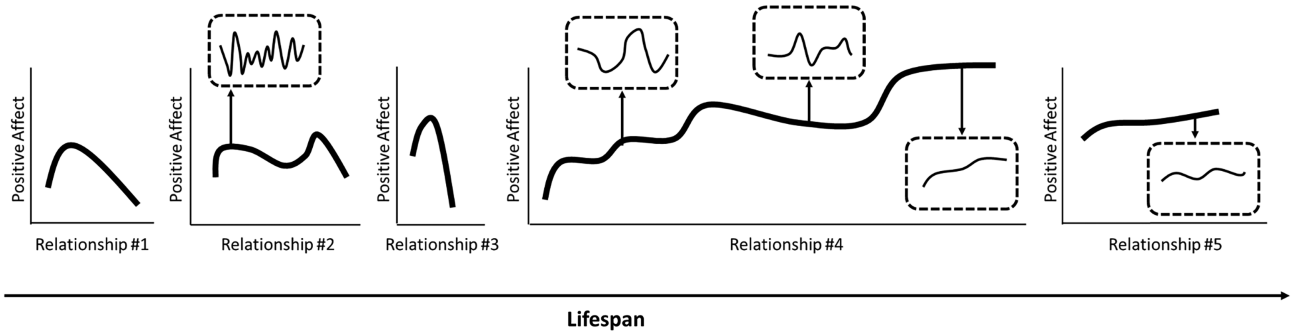
Forecasting relationship trajectories will require shifting between different timescales of analysis, much like weather forecasting. Meteorologists track minute-by-minute conditions to determine if a plane can take off while also tracking larger, recurring patterns, like jet stream shifts. Similarly, relationship scientists must attend to the microdynamics of interactions—such as moments of laughter, touch, or chemistry—while also examining how these moments are embedded in, and accumulate to shape, long-term relationship patterns. For instance, state relationship satisfaction within and across days appears to be distinct from trait-level relationship satisfaction (Scheling et al., 2025). Thus, building targeted predictive models will require understanding the unique patterns that emerge in the moment as well as the ways in which they unfold over time and evolve across the lifespan (see Figure 1 for a visual depiction of this idea).

First, we must examine relationships as they occur in the moment. Relationship science has been particularly strong at this level of analysis, offering insights into the interaction patterns that promote connection and relationship quality, such as the importance of feeling understood, validated, and cared for (e.g., A. M. Gordon & Chen, 2016; Jolink et al., 2022; Reis et al., 2004).

However, we can go even further; rather than averaging behavior across an entire exchange—as is often the case—analyzing processes at a finer temporal resolution (e.g., second-by-second behavioral coding) may provide the insights needed to unearth more meaningful couple-specific relationship patterns. Recent work in communication science, for example, has used dyadic time series data to analyze how partners respond to each other turn by turn, revealing dynamic patterns in how conversations are jointly constructed (e.g., Blickman et al., 2023; Solomon et al., 2022). This microlevel approach can enable within-dyad assessments of the biopsychosocial, affective, and linguistic processes that underlie connection in real time. For example, while two couples may display comparable average levels and variability of positivity during an interaction, the

Figure 1

Capturing Relationship Dynamics Across Timescales



- Trajectories of positive affect experienced over time by one individual toward their partner within five different romantic relationships across the lifespan
- The bold lines represent smoothed trajectories of positive affect over time, aggregated across periods (e.g., monthly patterns)
- Dashed boxes zoom in on momentary positive affect toward a partner at specific points (e.g., during a conversation or throughout a two-week span)

trajectory of that positivity may differ in meaningful ways. A steady decline may signal disengagement, whereas a gradual increase may reflect effective repair. Like the value of collecting continuous and localized data for weather forecasting, collecting enough data to identify these distinct moment-to-moment patterns, and their variation across relationships, can shed light on how relationship dynamics unfold for different couples and whether some trajectories may be more adaptive.

It is also critical to think in terms of longer timescales and study how relationship dynamics unfold not just within a single interaction but across weeks, months, and years. Short-term intensive methods, such as daily diary studies, provide valuable insights into daily fluctuations in relationship functioning. At the other end of the spectrum, long-term longitudinal studies capture broader relational trajectories across months and years. However, due to feasibility constraints, few studies have combined high-frequency measurement with extended time spans, such as daily assessments collected across years. Bridging this gap represents a powerful opportunity to understand how daily relational processes accumulate to shape long-term patterns. For example, are there certain patterns of state relationship satisfaction that eventually begin to inform and shape later trait relationship satisfaction?

Considering an even longer timescale, relationship trajectories should be considered as part of a larger whole (see Figure 1). Relationship patterns may hold different meanings depending on the relationship stage in which they occur. For example, a dip in satisfaction might signal instability early on but be less consequential after decades together. Examining how individuals' relationships evolve and interact across the broader lifespan is also important (Roberson et al., 2018). While some work has focused on the influence of past relational experiences to new ones (e.g., Brumbaugh & Fraley, 2006; Salvatore et al., 2011; Simpson et al., 2007), many important questions remain about the influence of early relationship experiences on later ones (Eastwick et al., 2019). With lifespan data, researchers can disentangle the extent to which relationship patterns are shaped by the person, the life phase, the period in history, or the relationship itself, which will be critical for accurate relationship forecasting.

Contextualizing Romantic Relationships

Relationships exist in context (Galovan et al., 2023; Pietromonaco & Overall, 2021); thus, building targeted predictive models will also require understanding the unique context in which relationships occur, similar to a meteorologist's need to consider both the broader and localized environment in which a particular weather forecast is taking place. A broader contextual view of the cultural, social–ecological, and biological factors shaping relationship dynamics may be one key to successfully building targeted predictive models. Here, we highlight some examples of how considering context is already beginning to advance the field.

Culture is one contextual factor that plays a role in shaping romantic relationships. Culture informs dating and sexual scripts (Pepping et al., 2017) and helps establish relational schemas, such as attachment (Joo et al., 2025). Recent work has examined cultural variation in constructs such as mate choice (Conroy-Beam et al., 2023), couples' communication (Ge et al., 2022), and interpretations of affectionate touch (Sorokowska et al., 2023). Although research has compared relationship phenomena across two or three cultures, truly global tests of relationship processes remain rare (see Eastwick et al., 2025; Sorokowska et al., 2023, for exceptions). A range of other sociocultural factors are linked to relationship functioning, such a socioeconomic status (Emery & Finkel, 2022; Ross et al., 2019), race (Debrosse et al., 2025; From et al., 2024), and political identity (A. M. Gordon et al., 2025). History also creates unique sociocultural contexts (e.g., historical psychology; Atari & Henrich, 2023). This may be especially critical when using existing data—collected at a specific moment in history—to make predictions about relationships at another time point. The physical environment might also influence relationships (Rim et al., 2025; Schertz et al., 2023). From population density to the natural elements of a setting, ecology is an understudied factor in relationship science.

Relationship scientists are also now turning to the role of biological factors in relationships (e.g., Edelstein & Chin, 2018; Khani et al., 2023). For example, sleep is linked to key relational processes (A. M. Gordon et al., 2017, 2021), including interpersonal conflict (A. M. Gordon & Chen, 2014), social support (Sell et al., 2023), and sex (MacKenzie et al., 2023). Inflammation is another example of a biological factor that plays a central role in shaping social experiences (Eisenberger et al., 2017; Muscatell & Inagaki, 2021). For instance, inflammation is linked to relationship satisfaction (Jolink et al., 2024) and the desire to be near a close other (Inagaki et al., 2015). What else can we learn about relationships by considering the body as context?

While we often focus on relationships composed of two partners, these dyads are embedded in larger social networks, including family members, friends, coworkers, and neighbors. In the case of consensually nonmonogamous relationships, members of one romantic dyad may be linked to additional romantic or sexual partners, making up an intricate network of supradyadic relationships. Predicting relationship outcomes for any couple will require understanding and modeling the social networks in which they are embedded.

Ultimately, collecting and modeling contextual data will no doubt put relationship scientists at an advantage when attempting to forecast relationships; targeted predictive models that include contextual information are likely to be more successful as well as more informative for theory building. For

example, this approach will allow researchers to identify when the influence of contextual factors is highly couple specific and when context has broad or consistent influence across couples.

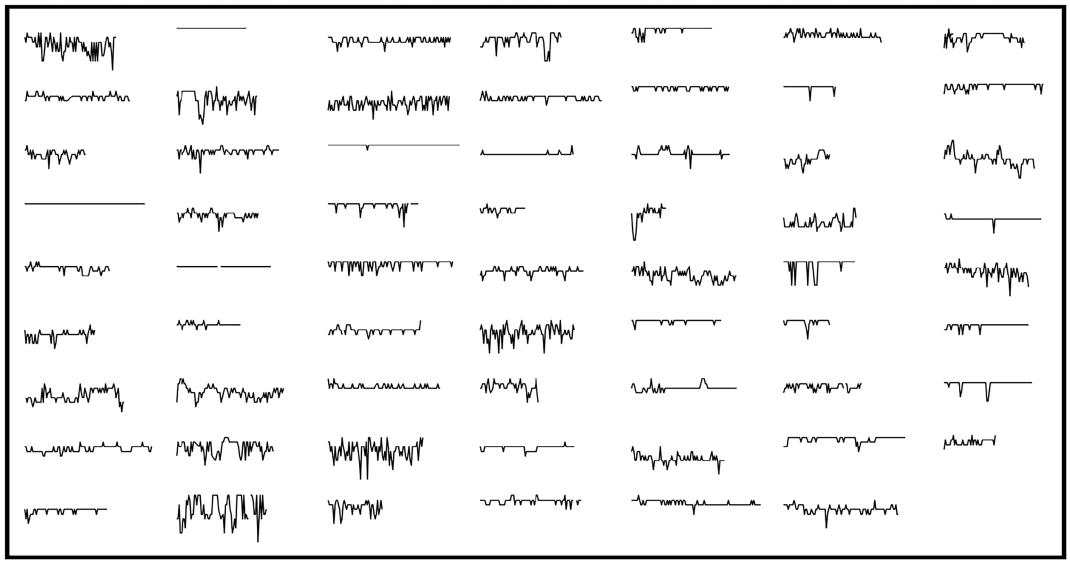
Uncovering Heterogeneity via Data Collection and Analysis

One reason relationship scientists may have struggled to identify key predictors of chemistry, compatibility, and future relationship outcomes for any given couple is that these predictors vary meaningfully across relationships. Just as knowing the average temperature across the United States on a given day does not tell you whether to grab a sweater when leaving your apartment in New York City, the aggregate trends we have uncovered in relationship science may obscure the intricacies of particular groups or specific couples. To try to forecast relationships, relationship science must incorporate heterogeneity in two ways—both by diversifying the samples that are studied and by analyzing how relational processes vary across couples. Relationship scientists are already considering the importance of diversifying our samples (e.g., McGorray et al., 2023). Here, we again note that given the importance of sociocultural context to relational processes, studying couples from varied backgrounds will be critical for any serious attempts to understand variability across individual relationships or build generalizable theoretical or empirical models from targeted predictions.

In terms of analytic approaches, relationship science has historically followed a nomothetic approach, seeking to identify associations that are theoretically consistent across individuals (Barlow & Nock, 2009). However, recent research has increasingly challenged the assumption that psychological constructs are always associated in consistent and easily predictable ways across individuals (e.g., Bolger et al., 2019; Joiner et al., 2024). Building targeted predictive models may be one solution. To do this, relationship scientists must incorporate an idiographic approach into their analyses. This approach focuses on identifying variables that are meaningful predictors for a single couple rather than an entire population and modeling individual relationship trajectories (see Figure 2 for an example of the diversity of individual relationship trajectories from a 28-day experience sampling method study). For example, instead of trying to identify the variables that best predict satisfaction across couples, idiographic methods instead seek to identify which variables are most important for a single couple.

An idiographic approach may actually help researchers identify broadly relevant relationship predictors that have been previously ignored due to null effects. For example, despite strong theorizing about the importance of partner similarity, it typically has a small or nonsignificant association with relationship outcomes (e.g., From et al., 2025). If similarity has a null (or even negative) effect for some couples and a positive effect for others, these effects effectively cancel out in nomothetic models, making similarity appear unimportant. An idiographic approach would highlight the ways similarity operates differently for different couples. Or it may be that similarity is meaningful for most couples, but

Figure 2
Between-Person Heterogeneity in Relationship Evaluations Over Time From 62 People



Note. Panel plot of relationship evaluation trajectories from a subset of individuals ($N = 62$) who were assessed multiple times per day for 28 days. Participants reported their current feelings about their relationship or partner (*y*-axis: 0 = *extremely negative* to 10 = *extremely positive*; *x*-axis: sampling point over time). Each line represents an individual participant's trajectory.

which aspects matter (e.g., personality vs. lifestyle choices) differs between couples.

Both nomothetic and idiographic approaches are valuable tools for relationship science, and both have their benefits and drawbacks. With a hybrid approach, especially one combining explanatory (theory-driven) and predictive (data-driven) models, researchers can capture unique person-specific variability while also identifying meaningful generalizable patterns (Beltz et al., 2016). For example, researchers may compare nomothetic and idiographic models of relationship processes (e.g., models of daily mood predicting relationship quality and breakups; Castro-Schilo & Ferrer, 2013) or search for factors that systematically predict observed interindividual variation. Just as weather is more predictable in some regions than others, this hybrid approach will also allow scientists to shed light on whether certain relationship processes or certain relationships are more predictable than others.

Many relationship scientists already utilize a hybrid approach. Multilevel modeling, a popular approach for analyzing dyadic longitudinal data, provides both fixed effects (population averages) and random effects (variability around population averages; A. M. Gordon & Thorson, 2024). The random effects capture idiographic information but are rarely the focus in psychological research, often being relegated to supplemental materials or not reported at all (McNeish et al., 2017). Individual- or couple-level random effects can be extracted and used as predictors in subsequent models, and interpreting these random effects is one way relationship scientists can easily integrate couple-specific heterogeneity into their models (for recent examples using this approach, see Scheling et al., 2025; Shimshock et al., 2024).

Part II: Practically Speaking, How Do We Do This?

How can we collect long-term granular data and incorporate context and heterogeneity to meaningfully build targeted predictive models? First, we must embrace interdisciplinarity: Relationship science will advance to a new stage of scientific discovery by drawing upon the conceptual, methodological, and statistical expertise of scholars in other disciplines. Second, we must leverage technological advances that enable the collection and modeling of couple-specific data. Finally, we must reconsider historical assumptions about romantic relationships.

Embracing Interdisciplinarity

Just as weather forecasting moved from craft to science in part through interdisciplinary integration (e.g., meteorology, mathematics, computer science), advancing relationship science will be faster and more impactful if we draw on approaches from a broad range of disciplines. Relationship scientists have traditionally come from diverse fields, including psychology, communication, family studies, human development, education, sociology, and anthropology. However, within and across these relationship-focused disciplines, research and dialogue often remain siloed. For example, researchers who study attraction and dating tend not to be the same ones who study relationship maintenance and dissolution. Relationship science has much to gain when scholars step outside their immediate subfields to engage with new ideas, methods, and theoretical frameworks. Below, we highlight three promising intersections between relationship science and other areas of inquiry as examples of the fruitfulness of taking a more interdisciplinary approach to relationship science.

One, several areas of science have similarly turned their attention to the question of how to generate more personalized, context-sensitive predictions (Bryan et al., 2021). For instance, in intervention science and health research, there is growing interest in "just-in-time" adaptive interventions that tailor support to individuals based on their momentary contexts and needs (Perski et al., 2022). In cancer research, scientists have been working to predict which treatments will be most effective for which patients rather than relying solely on population-level effects (Corti et al., 2023). Because these and other fields have been navigating similar challenges, relationship science can look to them to learn best practices—both conceptually and methodologically—as we move toward more targeted predictive models.

Two, insights from network science are well-poised to address questions about incorporating social context. Network science is the study of how elements within complex systems are structured and connected, focusing on the patterns and dynamics of their interactions (Barabási, 2016). Applied to romantic relationships, it can reveal how couples are embedded within broader social structures—families, friends, communities—and how those connections shape relationship processes. For example, social network approval predicts relationship dissolution (Agnew et al., 2001), and recent studies illustrate how attachment hierarchies differ between single and partnered adults (Tian & Freeman, 2024).

However, the promise of network science is even greater. For example, we could uncover how social network changes across life stages influence relationship quality or how daily interactions with others buffer or amplify couples' emotional experiences. Mapping these broader social connections can clarify how social context shapes relationships and provide valuable information for building targeted predictive models. Just as meteorologists study teleconnections—how distant weather patterns affect local conditions—relationships may be similarly shaped by other connections in their social networks.

Three, the types of time series and forecasting models necessary for building targeted predictive models are well-established in other disciplines. To model the complex dynamic systems that make up romantic relationships, analytic tools from fields such as atmospheric science, econometrics, and mathematics may be especially useful. Indeed, some relationship scientists have already adopted methods like

dynamical systems modeling to examine complex processes, such as emotional coregulation (e.g., Kuelz et al., 2022; Zee & Bolger, 2023). In other fields, researchers have used agent-based modeling to understand how norms and beliefs—such as those related to health and parenting practices—spread and cluster through social networks (Goldberg & Stein, 2018). Moreover, many disciplines are integrating machine learning and generative AI into predictive models (including weather forecasting; Bi et al., 2023; Price et al., 2025). Relationship scientists have long been at the forefront of using sophisticated statistical techniques that are both methodologically rigorous and widely interpretable (Bolger et al., 2000; Gonzalez & Griffin, 1997; Kashy & Kenny, 2000). The field is thus well-positioned to successfully adopt newer analytic tools.

Leveraging Technology

Relationship forecasting will only be possible if we have access to the right data—which, we argue, is repeated measures within individuals and dyads (i.e., intensive longitudinal data) along with contextual data. On the weather side, the installation of the automated surface observing system helped revolutionize weather forecasting in the United States by providing accurate, continuous, and on-demand surface weather data at locations across the country. Smartphones may be relationship science's version of an automated surface observing system. Estimates suggest that over 91% of U.S. adults owned a smartphone in 2024 (Pew Research Center, 2024), making it feasible to gather intensive longitudinal data over long periods of time with diverse groups. Indeed, there are hundreds of thousands of smartphone apps designed specifically for daily tracking—from fitness and diet to mood and mental health. Moreover, smartphones can do more than collect survey data, they can measure context as well; users can share audiovisual data or provide access to contextually relevant passive data, such as Global Positioning System tracking, call logs, message content, social media use, music history, health data, and screen time. These data can be combined with other publicly available digital data relevant to relationships (e.g., current events, Murray et al., 2021, and even weather, Sorokowski et al., 2023). Despite the popularity of smartphone apps, relationship scientists have yet to adopt widespread use of them for data collection. Researchers who have leveraged smartphones for this purpose have been highly successful, such as the Track Your Happiness project (Killingsworth & Gilbert, 2010) and the My BP Lab project (A. M. Gordon & Mendes, 2021).

With so much of people's social lives now online, there are creative opportunities to gather large-scale relationship data. For example, American adults most commonly meet their romantic partners online (Rosenfeld et al., 2019), which prompted several of us to develop a dating app for science. Revel is both a research study and a real swipe-based dating app that collects behavioral data and has surveys integrated into the app. With Revel, we can track relationship trajectories by gathering data from single individuals as they connect, chat, and even meet for the first time. Eventually, Revel will be integrated with another app to track those same individuals as they establish, maintain, and end relationships, allowing us to collect the fine-grained intensive longitudinal data necessary for building targeted predictive models.

Another relevant technological advance is the creation of large language models that enable large-scale qualitative analysis at lower effort. Self-report measures cannot reliably predict changes in relationship quality over time (Joel et al., 2020) and suffer from validity concerns (Joel et al., 2025). Collecting and analyzing intensive longitudinal qualitative data may be beneficial for idiographic analyses by allowing participants to tell us in their own words what matters to them. Indeed, some participants in our recent studies on self-narratives of relationships tell us they were more expressive and true to their relationships in their open-ended responses than when answering closed-ended questions. Language-based assessments may also better reflect how people naturally think and talk about their relationships in everyday life—such as in journal entries, voice memos, text messages, and social media posts—and provide opportunities for studying dyadic processes, such as language style matching between partners.

In sum, the dual technological advances of increased accessibility to relevant granular data as well as continued improvements in methods to collect such data have led to a moment in history when developing a predictive science of relationships may truly be possible.

Questioning Assumptions

Finally, to forecast relationships effectively, researchers need to revisit some of the core assumptions built into relationship science—particularly how we define relationship success and failure. Much of the literature equates success with persistence and longevity, whereas breakups are seen as evidence of relational unhappiness or failure. These assumptions may contribute to our limited ability to predict key couple-level outcomes, such as when a breakup will occur. Aggregate-level predictions can obscure two realities: (a) The reasons behind relationship milestones—like formation or dissolution—often vary widely across people, and (b) sociocultural and economic forces shape what relationships mean and how they unfold. Because historical and cultural variability influence relational frameworks, expectations, and decision-making processes (e.g., Cross & Joo, 2023), we cannot assume that relationships follow universal norms or that similar outcomes reflect the same underlying processes (or motivations) for everyone. Couple-specific models could help address these challenges by identifying what success and failure mean for each couple.

Conclusion

Weather forecasting is an apt analogy for predicting relationships not because weather predictions are perfect but because they are not perfect and likely never will be (Bauer et al., 2015; Kalnay, 2002). No matter how much we learn from relationship forecasting, it is unlikely we will ever be able to perfectly predict a relationship's formation or dissolution nor will we likely be able to tell a couple with perfect accuracy how happy they will be in 6 months. However, from a scientific standpoint, the goal is not perfect prediction; the goal is scientific insight, which we believe will be gained regardless of what we find.

Although our focus has been on the scientific insights gained with this pursuit, it is also important to consider the practical and ethical implications of relationship forecasting. What if we do learn to better predict the future of individual relationships? What if we can say which relationships will form or when a couple will experience conflict? These predictions would have implications for the couples themselves as well as intervention science. Although we have not learned how to intervene and change forecasted weather, there is evidence that interventions addressed at changing relationships—like couple therapy—can be effective. Efficacy in clinical practice is lower than in controlled lab settings, however, and effects dissipate over time for many couples (Bradbury & Bodenmann, 2020; Lebow & Snyder, 2022). Bringing together clinical intervention and relationship forecasting may improve both. If targeted predictive models give couples insights into their relationship patterns and vulnerabilities, they could direct couples to preventative clinical intervention, similar to the value in accurate storm warnings. Moreover, when couples are in therapy, continued relationship tracking throughout the intervention period might help the couple and therapist pinpoint areas in the relationship most in need of intervention. Of course, couples who are most at risk are the least likely to seek therapy (Tseng et al., 2021) despite potentially deriving the largest benefits (K. C. Gordon et al., 2019). The medical field has taken a similar approach to better inform patients' medical care (e.g., Tan et al., 2024) and may be able to provide insights into how to utilize this approach.

The idea of relationship forecasting also raises philosophical questions about risks and benefits. What would it mean if people could make relationship decisions based on imperfect predictions about future outcomes? Should couples have access to forecasts about their future? We see these issues as secondary to the science of prediction, but the philosophy and ethics of relationship forecasting certainly deserve consideration. We do note that many people already use apps to track themselves (e.g., fitness, mood) and even seek out predictions about their relational future—from algorithm-based dating apps to monthly horoscopes.

Despite these obstacles, we believe there is a lot of uncharted and exciting territory ahead of us with relationship forecasting. At the end of the day, we urge relationship scientists to consider thinking about relationships as dynamic, complex systems that can be mapped, modeled, and possibly even predicted. We believe doing so will yield valuable discoveries that just a short time ago would have felt impossible, similar to the great strides that have been made in mapping and modeling our atmosphere.

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