Radu's Rides: A Valentine's Day Special

Contributing Editor **Radu Craiu** offers some words of advice:

Nothing is more random than love. Its asymptotic properties are far from well understood, its underlying processes are certainly not stable and their convergence at best questionable. It is no surprise then that there are important advantages in love provided by a statistical training. Simply put, Occam's razor will give you an edge at any relationship stage.

Say you are on one of your first dates and your potential partner subtly inquires about the expected length of courtship before a love effect is firmly identified in the form of a desire to transition to the *next stage*. This may be the time to bring casually into conversation design of experiments as a long-honored field in our discipline. You may even go a little further and describe in broad strokes fractional factorial designs and their impact on collecting data before a decision is reached or, if you would like to enjoy your single life a little longer, you could take your time with a full factorial design.

If you feel emboldened by your date's not running away, you may go even further and allude gently to issues of identifiability that have kept many of us up at night. If that's too big a mountain to climb on such a momentous day, you could draw some weak connections between identifiability and unimodality, and mention that you believe in the global supremum implied by the "love of one's life", but you are also ready to get there via some intriguing local optima. Refrain from mentioning your attraction to saddle points, or the issue of label switching. As a Bayesian, you will know that multiple starting points for your random processes is a good way to achieve good mixing. The concepts of prior-data conflict or single-observation unbiased prior are best kept to yourself, lest they become weapons in the hands of untrained individuals. The replicability (not reproducibility) crisis usually extends to second dates, and the only person to blame is only you and your nonchalant use of *p*-hacking (should be pronounced like faking).

If it is not your first date and you are in an advanced stage of relationship-itis, sooner or later you will likely have to dive into a discussion on coupling and coalescing time. It is of paramount importance to understand that no matter how perfect your samples have been, coupling from the past rarely gets you exactly what you want. While bracing for impact, mention that this type of change involves a significant re-allocation of resources and remind everyone involved that, as many a grant writer can testify, a sample size calculation is not out of the question. This novel angle may release some of the pressure and allow you to delve into questions such as "What is a sample?" which can shine some light on your brightness, especially if you steer away from the whole "training vs testing sample" dilemma.

Depending on your propensity to settle down, you may define the experimental units as days spent together, weeks, or even years. If you go for the latter, do not blame this writer for your running out of emotional resources before the study is completed. If you are a probabilist, you may panic at the thought of stepping outside a comfortable martingale and decide to choose your fate by flipping a coin. I urge you to resist the temptation, but if you must, at least do it after your partner thoroughly understands the concept of a Bernoulli factory—at least this will buy you a year or so. In all matters related to love life, the experience accumulated from others' mistakes demonstrates that it is best to stay away from using extreme terms in our professional jargon, such as loss and utility functions, squared error, critical region, swindles or conditional statements—remember, love must remain unconditional.

For those who have passed the purgatory levels of dating and find themselves in a steady regime involving acceptances, rejections, multiple revisions and extended silences, an altogether different arsenal of methods comes in handy. Anyone in a healthy relationship will tell you that what is said in a couple is merely the tip of the metaphorical (and invisible) iceberg of feelings. The study of hidden Markov models will certainly come in handy when you try to infer the latent state of your relationship from a slightly overburned scone. The fact that some are using the same methods to track sharks should only fixate the idea a little more for you. If you are an expert in computing the chance of extreme events, you are a godsend for all your friends' relationships. Based on the faintest of indices which, to the untrained eye, look like random rolls of celestial dice, you will be able to anticipate events that can subject a couple to Floridian floods and Californian fires *at the same time*.

I have barely scratched the surface of what some solid statistical training can do for your love life. But there is so much more I wanted to tell you. When you're trying too hard to please everyone and their cousin, remember variance–bias trade-off; if you fail to live up to expectations, make sure you let them know it's not their fault, but rather your regression towards the mean[1]. If you get carried away in discussions, maybe it is time to remember that stopping times cannot depend on future events. Does your partner get caught up too much in day-to-day minutiae? Remind them that the road to fractals is paved with chaos. Above all else, embrace your status as a random process with the associated risk, occasional boundary-crossings and, I hope, plenty of non-stationarity.

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[1]   See also "XL-Files: Lectures (Marriages?) That Last" (2016) *IMS Bulletin* **45**(4).