

Review Article

A Stable Marriage Requires Communication

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ABSTRACT

Effective communication is a fundamental element of a stable marriage. It fosters understanding, empathy, and emotional connection between partners, enabling them to navigate conflicts, build trust, and offer mutual support. Clear communication helps clarify expectations, prevent misunderstandings, and strengthens intimacy. As individuals grow and change, open dialogue allows couples to adapt and maintain a healthy, evolving relationship. Ultimately, consistent and meaningful communication is key to nurturing a lasting and fulfilling partnership.

KEYWORDS

Communication, Marriage, Empathy, Trust, Partnership

1. INTRODUCTION

In the classic Stable Marriage Problem, there are n women and n men; each woman has a full preference order over the men and each man has a full preference order over the women. The challenge is to find a stable marriage: a one-to-one mapping between women and men that is

stable in the sense that it contains no blocking pair: a woman and man who mutually prefer each other over their current spouse in the marriage. Gale and Shapley proved that such a stable marriage exists by providing an algorithm for finding one. Their algorithm takes $\Theta(n^2)$ steps in the worst case, but only $\Theta(n \log n)$ steps in the average case, over independently and uniformly chosen preferences.

A partial answer to both questions was given by Ng and Hirschberg, who considered a model that allows two types of unit-cost queries to the preferences of the participants: "what is woman w 's ranking of man m ?" (and, dually, "what is man m 's ranking of woman w ?") and "which man does woman w rank at place k ?" (and, dually, "which woman does man m rank at place k ?"). In this model, they prove a tight $\Theta(n^2)$ lower bound on the number of queries that any deterministic algorithm that solves the stable marriage problem, or even verifies whether a given marriage is stable, must make in the worst case. Chou and Lu later showed that even if one is allowed to separately query each of the $\log n$ bits of the answer to queries such as "which man does woman w rank at place k ?" (and its dual query), $\Theta(n^2 \log n)$ such Boolean queries are still required in order to deterministically find a stable marriage.

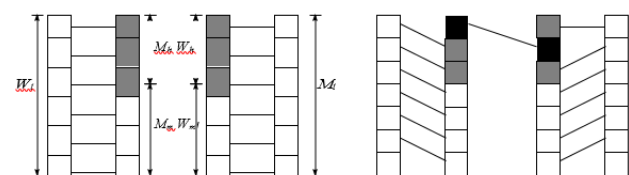
1.1 Arbitrary Preference Lists

While our main results are phrased in terms of full preference lists and perfect marriages, some additional and

intermediate results in Section 4 and in the Appendix deal with an extended model, which allows for preferences to specify "blacklists" (i.e. declare some potential spouses as unacceptable) and for marriages to specify that some participants remain single. (This model is nonetheless also a simplified version of that of A (not necessarily perfect) marriage between W and M is a one-to-one mapping between a subset of W and a subset of M . Given a marriage μ , we denote the set of married women (i.e. the subset of W over which μ is defined) by W_μ ; we analogously denote the set of married men by M_μ . For a marriage μ to be stable (w.r.t PW and PM), we require not only that no blocking pair exist with respect to it, but also that no participant $p \in W \cup M$ be married to someone not on the preference list of p .

We note that this model indeed generalizes the one in the sense that when the preference list of every participant contains all participants of the other side, then the definition of a stable marriage in this extended model (with respect to these preference lists) coincides with that of the simpler model (with respect to these preference lists when viewed as full preference lists). In particular, any marriage that is stable with respect to such preference lists prescribes for no participant to remain single

2. LITERATURE SURVEY



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