

RTI HEALTH SOLUTIONS®

Combining Revealed and Stated Preferences to Predict Uptake and Adherence

F. Reed Johnson, PhD

Distinguished Fellow and Principal Economist

RTI Health Solutions

frjohnson@rti.org

919.541.5958

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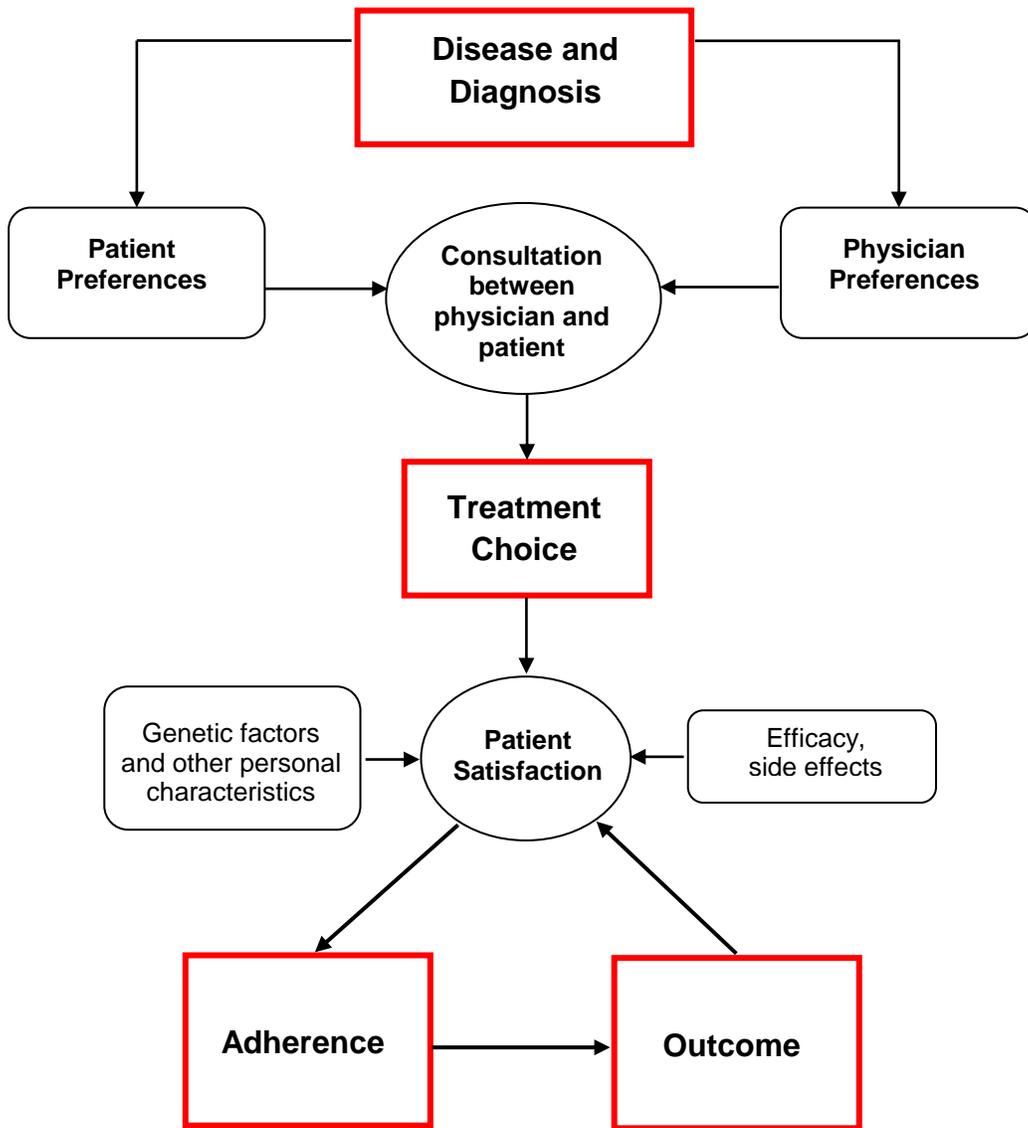
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Revealed and Stated Preferences

For several decades, revealed and stated preferences have widely and separately been used for economic analysis in marketing, environment, transport, and recently health sector (Boxall et al, 1996; Bhat and Castelar, 2002). Traditionally, economists have relied on actual market data to explain the behavior of decision makers. Data collected from eliciting decision-makers' preferences for treatment alternatives in a real-world setting is called revealed preference (RP) data. On the other hand, stated preference (SP) data is collected from eliciting decision-makers' preferences for a series of hypothetical or simulated treatment alternatives. Such conjoint-analysis surveys or discrete-choice experiments are controlled using a carefully designed experimental design with known statistical properties.

Relationships shown in Figure 1 suggest that patient preferences play a key role in patient satisfaction, which is likely to influence adherence and hence ultimately influence clinical outcomes, which in turn influence satisfaction. SP or conjoint methods give researchers experimental control over choice alternatives, which may include new features, and ensure statistical variability necessary to estimate preference weights for individual features. The important disadvantage of SP data is that they are based on hypothetical choices. We usually have no direct means of testing external validity and must assume that people actually would make the same choices in a real setting they say they would make in the hypothetical setting (Morwitz, Steckel, and Gupta, 1997).

Figure 1. Treatment Decisions and Outcomes



RP data consist of observations of actual patient or physician decisions. They thus indicate how people choose among available alternatives under real-world information, resource, and institutional constraints. However, it may not be possible to answer important questions with RP data for several reasons.

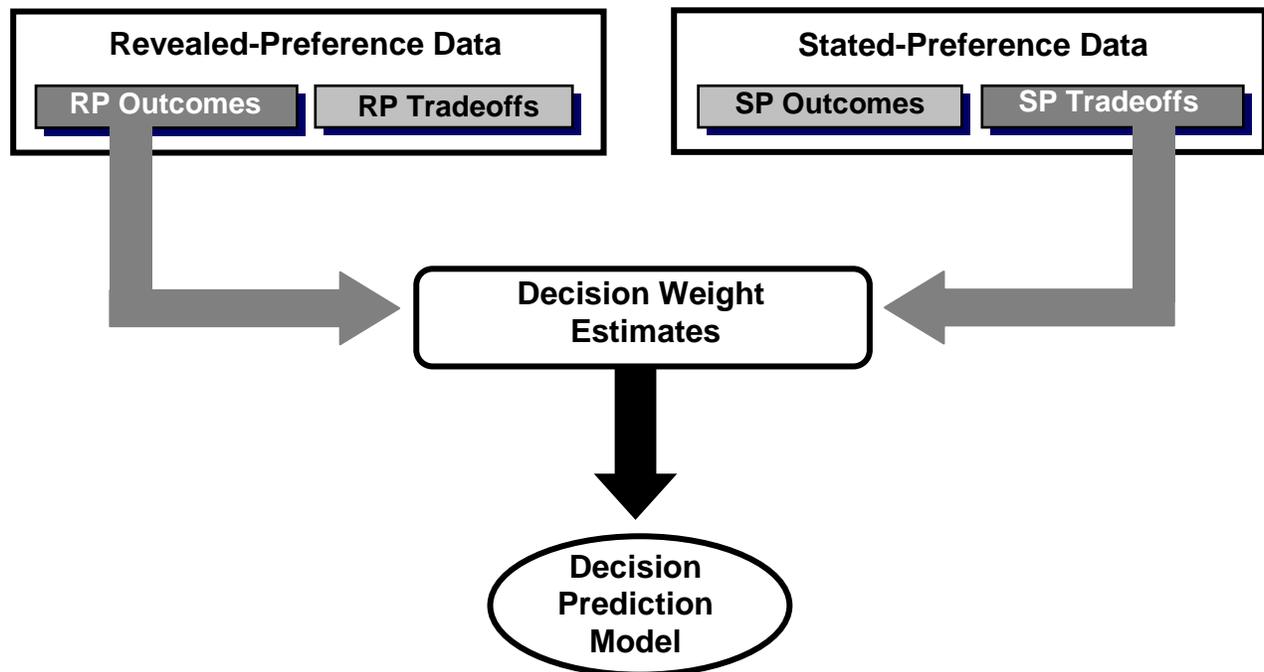
- Intervention features, including side-effect risks, are usually confounded in the small number of observable intervention alternatives and institutional settings.
- Even if a feature is not confounded, there may be insufficient observed variation to identify its contribution to patient satisfaction.
- There is no RP information about new or potential intervention features.

RP data and SP data each have advantages and disadvantages when separately used to investigate the impact of treatment attributes on the behavior of decision makers. RP data on actual decisions provide good information on treatment outcomes, but little or no information about the relative importance of treatment attributes to decision makers. Conversely, SP data provide little information on outcomes, but good information on tradeoffs within treatment attributes. The high variability of attributes provided by an SP experimental design makes it possible to estimate the relative importance of treatment attributes to decision makers.

Combined Revealed and Stated Preferences

Models based on combining RP and SP data can predict choices better than either an RP or SP model alone. Including SP data, which have independent variation in treatment features, reduces the collinearity that generally exists in RP data and generates observations for attributes or attribute values that are uncommon or nonexistent in the RP data. Therefore,

Figure 2: Relative Strengths of RP and SP Data in Joint Model



attribute effects which could not be estimated or weakly estimated in the RP model are now clearly estimated. Including the RP data imposes the discipline of real-world resource and information constraints. Swait, Louviere, and Williams (1994) and Louviere (1996) present a framework for combining RP and SP data. Figure 2 illustrates this so-called “data enrichment” approach. As indicated in this figure, the RP data provide little information on tradeoffs, but good information on outcomes. Conversely, SP data provide little information on outcomes, but good information on tradeoffs. Hensher, Louviere, and Swait (1999), Louviere (1996), Swait and Adamowicz (1996), and Brownstone et al. (2000) describe the appropriate steps for joint estimation of RP/SP models.

Hensher, Louviere, and Swait (1999), Louviere (1996), Swait and Adamowicz (1996), and Brownstone et al. (2000) describe the appropriate steps for joint estimation of RP/SP models. As noted, the underlying preference structures in RP and SP are different due to different error variance/scale parameter. Thus the process of combining RP and SP data and jointly estimating the attribute effects involves simultaneously scaling the datasets and constraining parameters to be equal. That is, one of the scale parameters is normalized to one and the other then is estimated as a relative scale value.

Decision makers face different circumstances when making RP and SP choices. Several studies in environmental and transportation economics have shown RP and SP datasets to be significantly different, but correlated with one another. Parameters separately estimated using RP data were found to be significantly different from those obtained with SP data. In most cases, the SP parameters are significantly larger than the RP parameters. Such differences are attributed to differences in unobserved factors/error variance between RP data and the SP data (Ben-Akiva et al, 2002; Bhat and Castelar, 2002; Adamowicz and Louviere, 1994; Azevedo et al, 2003). Results of separate RP and SP studies with application in environment and health conducted by Bhat and Castelar (2002) and Mark and Swait (2003) indicated that the error variance of the SP data is smaller than that of the RP data.

After controlling for differences in error variances, Bhat and Castelar (2002), Adamowicz and Louviere (1994), Azevedo et al (2003) have shown that parameters estimated from joint RP-SP model are not significantly different from those separately estimated from RP and SP data. Adamowicz and Louviere (1994) found that these parameters were closer to RP estimates than SP estimates. Mark and Swait (2003) in a premier application of joint RP-SP data in health

found insignificant differences between parameters from the joint RP-SP model and those from the separate models only when socio-demographic variables of physicians are different in the two datasets. These findings strongly support the assumption that RP and SP data come from a common underlying preference structure.

Joint models predict choices better than either the RP or SP models alone. By combining SP and RP information, joint models enhance the strengths and diminish the drawbacks of each individual method. Including SP data, which is orthogonal in attribute levels, reduces the collinearity that generally exists in RP data and generates observations for attributes or attribute values that are uncommon or nonexistent in the RP data. Including the RP data imposes the discipline of real-world resource and information constraints.

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