

The weak foundations of conjoint analysis: Methodological limitations for assessing consumer preferences and estimating damages in litigation settings

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Conjoint analysis is a survey-based methodology used for measuring consumer preferences. The method was popularized in marketing research in the 1970s and has since become a frequently used tool in new product design, target market selection, and new product pricing decisions.¹

Criticisms of conjoint in litigation (and elsewhere) generally revolve around a specific implementation of conjoint rather than a challenge to the methodology per se.

During the last decade, conjoint analysis has also found use in the context of litigation. It has been used to assess preferences for product features in intellectual property disputes and to assess damages in product liability and false advertising class actions.²

In litigation, the battleground regarding the appropriateness of the use of conjoint analysis has historically focused on whether the methodology can model market prices and whether the specific conjoint analysis as implemented can reliably estimate consumer preferences for the product at issue.³

In some cases, courts accepted conjoint analysis as a methodology that can estimate market prices and damages in product liability and false advertising class actions.⁴ In other cases, conjoint analysis was rejected as an appropriate methodology to estimate market prices and damages because conjoint analysis by itself can at best estimate consumer preferences (or demand).⁵

Other criticisms of conjoint analysis involved survey design issues such as not incorporating realistic product choices available in the market,⁶ not properly isolating the effect of allegedly misleading statements,⁷ and testing a hypothetical product attribute that does not properly match the plaintiffs' theory of liability.⁸ In sum, criticisms of conjoint in litigation (and elsewhere) generally

revolve around a specific implementation of conjoint rather than a challenge to the methodology per se.

However, a recent review article by David Gal and Itamar Simonson in "Consumer Psychology Review" (Gal and Simonson (2021))⁹ challenges the foundations of conjoint analysis. The authors argue that the methodology does not capture how consumers actually form preferences and make choices in the real world. Further, in reviewing the evidence, the authors conclude that the limited validation studies of conjoint analysis have not supported the value of the methodology in predicting actual consumer choices.

In the sections below, this article introduces conjoint analysis, describes some of its foundational weaknesses, and provides examples from litigation settings that cast further doubt on the utility and reliability of the use of conjoint in litigation.

What is conjoint analysis?

Conjoint analysis is a survey-based methodology used for measuring consumer preferences for products and product attributes. It assumes, among other things, (i) that an individual's preference or "utility" for a product is some combination (usually the sum) of that person's utilities for the individual product attributes, and (ii) that individuals make trade-offs across attributes.

As an example, when making a decision for which apartment to rent, an individual could make trade-offs over the amount to pay for rent and other characteristics of the apartment, such as the square footage of the unit, number of bedrooms or bathrooms, neighborhood, time to commute to work, public transportation options, or building amenities. An individual may be, for example, willing to rent an apartment that has a smaller square footage but has a lower rent.

A common type of conjoint analysis seen in litigation is called choice-based conjoint analysis. Individuals in this type of study are asked to indicate their preferred option from each of a series of option sets, where the options in each set are products that each have a different combination of various attributes.

For example, study participants might be tasked to make a choice among four cellular phone options that differ on brand, price, screen size, camera quality, and battery life. They then repeat this across many sets of four different phones. Statistical techniques are then used to estimate how the “level” of each attribute (e.g., a particular price level or a particular brand) contributes to the individuals’ choices, with each attribute level being assigned a utility or “part-worth” indicating its relative value to the individuals.¹⁰

With these part-worths, a consumer’s preference (or utility) for a product consisting of any combination of attributes can be computed by summing the part-worths of the attribute levels.¹¹ In addition, using these part-worths, one can estimate how much more a consumer is willing to pay to obtain a particular feature or an improved versus inferior level of a given attribute. This information, in the form of a dollar or percentage reduction in product value, is commonly used in consumer class action litigation as a key input to the estimation of economic damages.

The popularity of conjoint analysis is not based on evidence

The popularity of conjoint analysis as a marketing research technique over several decades has led to the assumption that it is a reliable, well-validated method of assessing consumer preferences. Its relative methodological sophistication and the statistically precise estimates it yields likely also contribute to the perception that it is “scientific” and rigorous.

Yet, while limitations in the way conjoint might be implemented have often been noted in litigation and elsewhere, Gal and Simonson (2021) shows that the underpinning logic of the methodology has rarely been examined by academics, nor has the method been subjected to extensive real-world validation.

Part of the rationale for the use of conjoint analysis is the view that consumers can more easily and more reliably provide a holistic evaluation of a product composed of multiple attributes (from which the relative value of individual attributes can be inferred indirectly) than they can directly indicate the relative importance of individual attributes.

Yet, as described in Gal and Simonson (2021), simpler preference measurement tools, such as asking individuals to state their willingness to pay or to rank/rate the relative importance of attributes and attribute levels, have tended to perform as well as or better than conjoint in studies where these measures were used to predict real-world choices.

Moreover, in an absolute sense, neither conjoint nor these simpler preference measurement methods have been shown to predict individuals’ real-world choices particularly well.

Conjoint analysis is based on inaccurate assumptions regarding how individuals make choices

In Gal and Simonson (2021), the authors explain that conjoint analysis often fails to reliably predict consumer preferences because of the false assumptions that precise, stable preferences are the key

determinants of individuals’ choices and that preferences can be reliably measured through the methodology.

To be sure, in some cases consumers have strong stable preferences for particular products or attributes, such as a rule against buying bottled water in airports. In such cases, however, the use of conjoint is unlikely to provide much value as consumers can easily articulate these preferences.

Conversely, for decisions that are new or non-habitual (and where conjoint is most expected to add value), consumers tend to lack precise, stable preferences for how they might trade off certain product attributes for others.

For these decisions, consumers tend to have general preferences (e.g., for quality, value, convenience, style) as opposed to precise, stable preferences for specific products or for how they would trade off one product attribute for another.

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For example, before engaging in a purchase decision for a barbecue grill, many consumers likely would not have a preference for a specific model or configuration. They likely would not have well-defined notions about how much more they prefer a grill with a few extra square inches of cooking area or with a few extra tool hooks. Yet respondents are commonly asked to make these types of trade-offs in conjoint analysis performed in the litigation context.

In *Williams v. Apple*, for instance, which involved allegations of misrepresentations in the terms of service of Apple’s iCloud services, respondents to a conjoint survey were asked to trade off brand, storage size, storage location (fully on Apple servers, or partially on third-party servers), and number of users that can share storage (only one user, or up to six users), among other attributes.¹² Many consumers are unlikely to have stable preferences for how they would trade off different levels of these kinds of attributes.

In fact, consumers generally do not approach such decisions with well-formed preferences; rather they “construct” their preferences in the process of making a decision. Many of the factors that influence this process are largely unpredictable and cannot be anticipated ahead of time, such as goals or information that only becomes accessible at the time the decision is being made.

This is especially the case when consumers are not exposed to key choice determinants — such as reviews, new options, and product recommendations — until they are at or near the point of making a decision.

To illustrate, while shopping, a consumer might read a review that elucidates the benefits of a particular product feature the consumer would not have otherwise appreciated, and this might then play a decisive role in the consumer's choice. The influence of such just-in-time information casts doubt on the value of conjoint analysis, which aims to measure preferences precisely. As such, conjoint analysis is likely to inflate the importance of attributes that ultimately play little role in consumers' actual purchase decisions.

Other limitations of conjoint analysis for capturing how consumers make choices

Conjoint analysis has additional features that impinge on its ability to capture the way individuals form preferences. For example, by asking consumers to make choices among options that vary on a set of attributes, the methodology prods consumers to make trade-offs among attributes and to do so consistently across choices. This leads to the appearance that consumers' choices are precisely determined by preferences for trade-offs among the specified attributes.

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However, this often will not reflect how consumers choose in the real world, and might therefore lead to a distorted evaluation. For example, in some categories consumers will base their choice primarily on a single factor (e.g., brand), yet the conjoint procedure will lead them to consider and make trade-offs that they would not otherwise make.¹³

A related issue identified in Gal and Simonson (2021) is that the inputs individuals rely on when making choices in a conjoint task tend to be different from those they rely on when making actual choices.

For example, when buying a car, individuals may depend heavily on the advice of a friend or may simply decide to visit the lot of a favored brand. This will lead consumers to be exposed to a very different set of options than they would typically encounter in a conjoint task.

These types of external factors were not present, for instance, in the plaintiffs' conjoint survey of Jeep Grand Cherokee purchasers in *In re FCA EcoDiesel Litigation*, which involved allegations of emissions defeat devices. The conjoint survey had as attributes only engine performance (the attribute of interest), drive type, trim level, steering performance, car connectivity system performance, and price.¹⁴

The issue of motivation is also important. As explained in Gal and Simonson (2021), when evaluating mundane or trivial features, because they know their preferences are being measured and might be impactful, consumers are likely to be more deliberative and

reflective of their choices in a conjoint task than when making a similar choice in the real world.

Conversely, for features consumers consider important, they are likely to be less motivated to deliberate and rigorously evaluate the alternatives in a conjoint task than in the real world given the relatively lower motivation in the former context.

As an example of a potentially unimportant attribute, in *Krommenhock v. Post Foods*, which involved allegations of misrepresentations on cereal boxes, respondents were asked to trade off cereal box statements such as "less processed nutrition you can see," "helps support a healthy metabolism," and "is an excellent source of folic acid and iron."¹⁵ Many consumers likely would pay more attention to these label claims in the conjoint exercise than they would in a real-world purchasing decision.

Conclusion

Despite its popularity, the assumptions and performance of conjoint analysis have been subject to relatively little scrutiny. Indeed, criticisms of conjoint in litigation (and elsewhere) generally revolve around a specific implementation of conjoint rather than a challenge to the methodology per se. When the criticisms take the form of arguing that the manner in which a particular conjoint task is implemented is not realistic, they may falsely imply that by improving the degree of realism the limitations can be remedied.¹⁶

In fact, as described in this article, conjoint analysis is founded on fundamentally inaccurate assumptions, namely that precise, stable preferences relatively accurately determine consumer choices, and that these preferences can be measured through tasking consumers to compare options comprised of a list of pre-specified attributes. This does not reflect the typical manner in which individuals form preferences and make choices.

In sum, given that conjoint is built on inaccurate assumptions regarding how people make choices, conjoint analysis should not be expected to yield reliable measures of individuals' preferences. This conclusion applies to the use of conjoint analysis to estimate consumer preferences and damages in litigation contexts and calls into question the reliability of results generated by conjoint surveys in such settings.

Notes

¹ Green and Rao's 1971 paper introduced conjoint analysis to the field of marketing. *In re GM Ignition Switch MDL Litigation*, 407 F. Supp. 3d 212 (S.D.N.Y.) Paul E. Green and Vithala R. Rao, "Conjoint Measurement for Quantifying Judgmental Data," *Journal of Marketing Research* 8, no. 3 (1971): 355–363. For a discussion of various applications of conjoint analysis, see Vithala R. Rao, *Applied Conjoint Analysis* (Springer, 2014) ("Rao (2014)").

² For example, conjoint analysis has been proposed or implemented in recent product liability class actions in the auto industry (*In re GM Ignition Switch MDL Litigation*, 407 F. Supp. 3d 212 (S.D.N.Y.); *In re FCA EcoDiesel Litigation*, No. 3:17-MD-02777-EMC (N.D. Cal.); *Callaway v. Mercedes-Benz*, No. 8:14-cv-02011 (C.D. Cal. 2014); *In re MyFord Touch Consumer Litigation*, 291 F. Supp. 3d 936 (N.D. Cal. 2018); *Flynn v. FCA US LLC*, No. 3:15-cv-00855 (S.D. Ill.); in the packaged food industry (*Zakaria v. Gerber Products Co.*, No. 2:15-cv-00200 (C.D. Cal. 2015); *Morales v. Kraft Foods Group Inc.*, No. LA CV 14-04387 JAK (PJWx) (C.D. Cal.)); and in the consumer electronics industry (*Davidson v. Apple Inc.*, No. 16-CV-04942-LHK (N.D. Cal.)). Examples of the use of conjoint analysis in intellectual property rights disputes include *Apple Inc. v. Samsung Electronics Co.*, 67 F. Supp. 3d 1100 (N.D. Cal. 2014); *Visteon Global Technologies Inc. v.*

Garmin International Inc., No. 10-CV-10578, 2016 WL 5956325 (E.D. Mich.); and *TV Interactive Data Corp. v. Sony Corp.*, 929 F. Supp. 2d 1006 (N.D. Cal. 2013).

³ Campbell, Mark D., et al. (2021), "Damages," in *A Practitioner's Guide to Class Actions*, Hogan Green M., and A. Nassihi, eds., Chicago, ABA, 85–103.

⁴ See *In re Dial Complete Marketing and Sales Practices Litigation*, 320 F.R.D. 326 (D.N.H. 2017), *Hilsley v. Ocean Spray Cranberries Inc.*, No. 17-CV-2335 (GPC), 2019 WL 3006465 (S.D. Cal. July 10, 2019); *In re Arris Cable Modem Consumer Litigation*, 327 F.R.D. 334 (N.D. Cal. 2018); *Schneider v. Chipotle Mexican Grill Inc.*, 328 F.R.D. 520 (N.D. Cal. 2018); *Fitzhenry-Russell v. Dr. Pepper Snapple Group Inc.*, 326 F.R.D. 592 (N.D. Cal. 2018); *In re MyFord Touch Consumer Litigation*, 291 F. Supp. 3d 936 (N.D. Cal. 2018); *Broomfield v. Craft Brew Alliance Inc.*, No. 17-CV-01027 (BLF), 2018 WL 4952519 (N.D. Cal. Sept. 25, 2018); *Kaupelis v. Harbor Freight Tools United States*, No. SACV 19-1203 JVS (DFMx), 2020 U.S. Dist. LEXIS 186249 (C.D. Cal. Sept. 23, 2020).

⁵ In these cases, courts reiterated the fundamental economic concept that market prices are derived from the interaction of market demand and supply, and conjoint analysis on its own is not sufficient to estimate market prices. See, e.g., *Schechner v. Whirlpool Corp.*, No. 2:16-cv-12409-SJM-RSW, ECF No. 176 (E.D. Mich. 2019). See also *In re General Motors LLC Ignition Switch Litigation*, 407 F. Supp. 3d 212 (S.D.N.Y.), motion to certify appeal granted, reconsideration denied, 427 F. Supp. 3d 374 (S.D.N.Y. 2019); *Saavedra v. Eli Lilly*, No. 2:12-cv-9366-SVW (MANx) (C.D. Cal.); *In Re NJOY*

Consumer Class Action Litigation, No. CV 14-00428 MMM (JEMx) (C.D. Cal.); *Morales v. Kraft Foods Group, Inc.*, LA CV 14-04387 JAK (PJWx) (C.D. Cal.).

⁶ *Schechner v. Whirlpool Corp.*, No. 2:16-cv-12409-SJM-RSW, ECF No. 176 (E.D. Mich. 2019).

⁷ *Hughes v. The Ester C Co.*, No. 317 F.R.D. 333 (E.D.N.Y. 2016).

⁸ *Davidson et al. v. Apple Inc.*, No. 16-CV-04942-LHK (N.D. Cal.).

⁹ Gal, D. and Simonson, I. (2021), Predicting consumers' choices in the age of the internet, AI, and almost perfect tracking: Some things change, the key challenges do not. *Consum Psychol Rev*, 4: 135-152.

¹⁰ For a discussion of choice-based conjoint studies, see Rao (2014).

¹¹ Moshe Ben-Akiva et al., "Foundations of Stated Preference Elicitation: Consumer Behavior and Choice Based Conjoint Analysis," *Foundations and Trends® in Econometrics* 10, nos. 1–2 (2019): 1–144 ("Ben-Akiva et al. (2019)"), at 19.

¹² *Williams et al. v. Apple Inc.*, No. 5:19-cv-04700-LHK (N.D. Cal.).

¹³ James R. Bettman, "Constructive Consumer Choice Processes," *Journal of Consumer Research* 25, no. 3 (1998): 187–217.

¹⁴ *In re FCA EcoDiesel Litigation*, No. 3:17-MD-02777-EMC (N.D. Cal.).

¹⁵ *Krommenhock et al. v. Post Foods LLC*, No. 3:16-cv-04958-WHO (N.D. Cal.).

¹⁶ See, e.g., Ben-Akiva et al. (2019), pp. 12–25.

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