GAP: The Repair Kit for Conjoint Analyses

The 'General Algorithm for Patching Conjoint Analyses' ('GAP' for short) is a general 'repair kit' for conjoint analyses that uses an appropriate design plus a few extra questions to ascertain valid correction values which can then be deployed to adjust the results. Distortions that arise as a result of the notoriously artificial conjoint survey situation can thus be efficiently corrected. In this article, the author explains the GAP method and gives two specific examples of its application. Author Dr. Florian Bauer is the co-founder of Vocatus AG, a Munich based market research and consulting firm, and a world-renowned researcher in the fields of pricing, customer satisfaction and image analysis.

Conjoint analyses are indispensable market research tools which have been constantly refined over recent years, thereby making the procedure noticeably more efficient and increasing the validity of its predictions. However, two serious and much-discussed problems remain unresolved. These problems relate to emotional and cognitive distortions which inevitably arise as a result of the underlying assumptions made by conjoint analyses, and which thereby restrict their meaningfulness. The 'General Algorithm for Patching Conjoint Analyses' ('GAP' for short) offers a scientifically based 'repair kit' that will eliminate these distortions in a targeted manner, thereby producing more valid results.

Conjoint analyses: two serious problems remain unresolved.

The particular added value of a conjoint analysis consists in the fact that values that weren't directly measured can also be predicted. This is generally achieved by linking the values between the measuring points under examination (attribute level) in a linear fashion. If, for example, a conjoint analysis has revealed that 80% of customers would buy a CD costing 5 euros, but only 20% would buy the CD at a price of 15 euros, it's then assumed that half of them would buy at a price of 10 euros.

Despite its elegance, this linear interpolation is deeply flawed.

Despite its elegance, this procedure is deeply flawed because, if pricing psychology has taught us anything, it's that price assessment isn't linear, but instead follows a stepped pattern. Moreover, a price threshold of this kind is particularly likely to be encountered at a figure of 10 euros, so it matters a great deal to customers whether a product is offered for 9.95 euros or 10.10 euros. In this case, a linear interpolation is far removed from the real-life situation.

In addition to this cognitive distortion, every conjoint analysis contains a second distortion that is emotionally determined: conjoint analysis always assumes that customers take account of a variety of information about the attributes and prices of all competing products when making their purchase decision. Nevertheless, customers often aren't in the slightest bit interested in the price of a specific product, or aren't even aware of it.

GAP is a repair kit that eliminates distortions from conjoint analysis.

For example, studies conducted in recent years have repeatedly demonstrated that 80% of regular newspaper buyers don't know what the paper they buy actually costs. In this case, confrontation with the actual price or other product attributes within the context of the conjoint sequence means that one inevitably provokes greater involvement than the customer would otherwise manifest.

Both distortions are inherent within the method and cannot be resolved within the context of new conjoint variants.

This therefore alters the decision situation in a marked and unrealistic manner, which typically leads to much higher sensitivities. What's special about both distortions is that they are inherent within the method, i.e. they only arise as a result of the typical conjoint survey situation and cannot therefore be resolved within the context of new conjoint variants. The fact that conjoint fails to cope with these distortions shouldn't prevent us from realizing that there are excellent and frequently validated quantification options for both problems. This requires an independent correction procedure which is applied outside the classic conjoint sequence. The key challenge here is not to develop a new methodological approach which avoids these distortions, but to seamlessly combine its results with those of the existing conjoint analysis.

Within the context of the 'General Algorithm for Patching Conjoint Analyses' ('GAP' for short) this article will now demonstrate how one can adapt and combine these techniques and directly link them with the conjoint analysis in order to deliberately balance out the distortions described.

'Emotional Patch': Taking Account of Product Involvement

Many customers know very little about the prices or attributes of the products they buy. If there is limited price knowledge or price interest, a conjoint analysis doesn't lead to valid results, the 'emotional patch' uses an experimental design to quantify the effects of varying product involvement. The correction values that are thereby obtained are integrated into the conjoint modeling and illustrate the effects of varying involvement, which are evened out in classic conjoint analysis.

When conducting market research projects, we often witness heated debates involving sales, marketing, product development, production and purchasing where people discuss end consumers' preferences and 'willingness to pay'. In general, they studiously ignore the fact that end consumers mainly differ from experts within the company insofar as their lives don't exclusively revolve around hair-dryers, adhesive tape rollers, or cross-head screws.

End consumers often know very little about product attributes or prices.

On the contrary, end consumers often know very little about precise product attributes, the competition, or prices, although this doesn't prevent them from buying and using the product. Because employees within a company devote their entire working day to their own products they often fail to notice the most striking problem associated with conjoint analyses: conjoint analysis assumes that customers have all the information about the prices and attributes of competing products at their fingertips and duly examine it in great depth, just as the company's employees generally do with their own products.

End consumers often know very little about precise product attributes, the competition, or prices, although this doesn't prevent them from buying and using the product.

Conjoint analysis has little to do with real-life decision situations.

For example, when conducting a conjoint analysis we might ask one respondent (Mr. Miller) whether he would prefer the free bank account offered by Bank A (with no interest paid if he's in credit) or the account proposed by Bank B, with annual charges of 19.90 euros but 1% interest paid on accounts.

When presented with this question as part of the conjoint survey, Mr. Miller possibly feels he's been transported back to his math class at school. He then works out that Account B makes sense for him if his average balance is above 1990 euros, and on this basis he thus puts a cross next to this option. This is a very artificial setting and has little to do with a real-life decision situation.

Conjoint analysis on its own doesn't make sense if there's limited price interest.

In real life, Mr. Miller has of course never given a second thought to what his bank account costs. He's had an account at his local bank for the last 17 years, with no interest paid despite annual charges of just under 120 euros (€9.90 a month).

So to begin with. Mr. Miller isn't aware of the charges associated with his account (no price knowledge), and secondly he'd never dream of running from one bank to another comparing the terms and conditions of various bank accounts (no price interest).

If this lack of price knowledge and price interest applies not only to Mr. Miller but to many customers or even the majority of them, conjoint analysis no longer produces realistic results because the product involvement that's assumed (and induced by the survey situation) is also unrealistic.

Price knowledge and price interest are investigated prior to the conjoint analysis.

The purchase of an iPad can lead to a totally different result. In this case, it's possible that 70% of customers have sought detailed information before making a purchase, and are very clued up about the prices as well as the specifications of the various offers. If the conjoint analysis shows there's an above-average average rise in 'willingness to pay' if the memory capacity is increased, this result is also actually relevant for roughly 70% of customers.

A realistic picture of actual purchase behavior emerges.

This is precisely where the 'emotional patch' comes into play: since product involvement is the decisive factor here, this is ascertained independently of the conjoint analysis within the context of a monadic experimental design which investigates the extent to which differing product involvement impacts on the sensitivity of assessing attractiveness.

Based on the results that are thereby obtained, it's possible to duly moderate the conjoint analysis findings at the individual level in order to obtain a realistic picture of actual buyer behavior.

Conjoint analysis can be carried out as normal and then be corrected retrospectively.

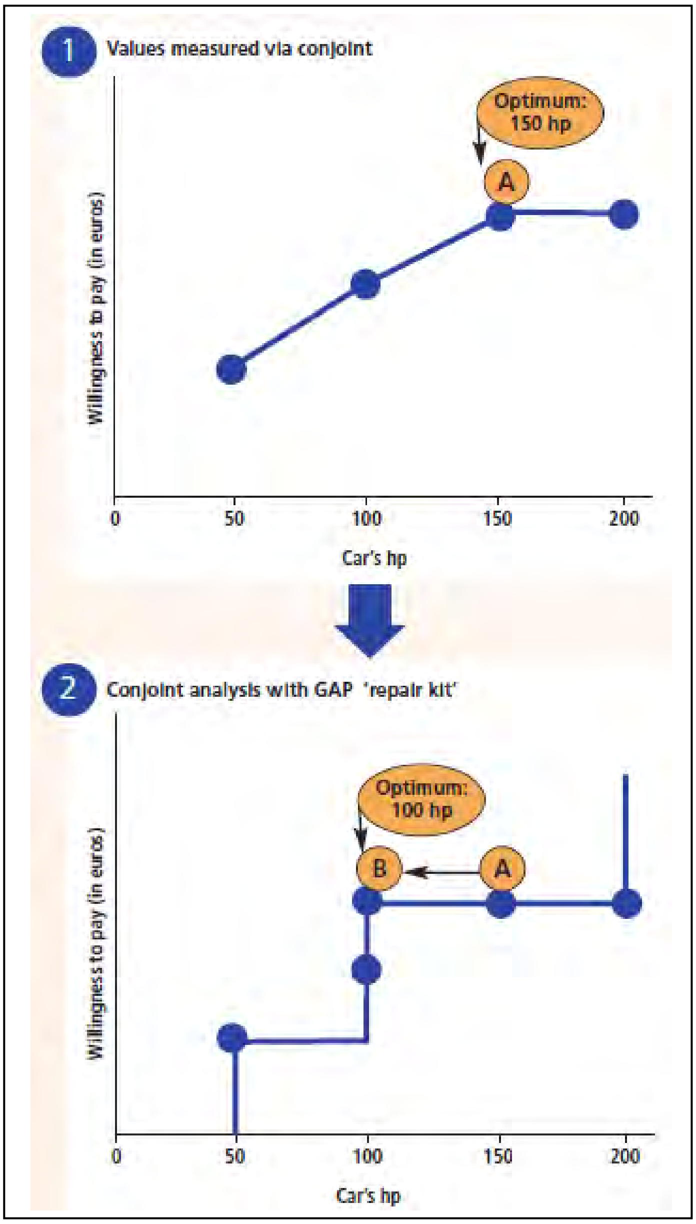
The major advantage of this procedure is that the additional data which is subsequently required to correct the results can be gathered as usual in advance of the conjoint analysis. Nevertheless, the GAP procedure is only appropriate if one is dealing with manageable 'repairs'.

If the survey demonstrates that 95% of customers have no product involvement whatsoever, one is then allowed to ask whether conjoint analysis is really the method of choice in this case, since it only makes sense for the remaining 5%.

'Cognitive Patch': Integration of Assessment Thresholds

The 'cognitive patch' combines conjoint analysis with psychological perception and assessment thresholds. In order to achieve this, the thresholds are ascertained outside the actual conjoint analysis, but are taken account of in the conjoint modeling within the context of interpolating partial utilities. This therefore combines the strengths of conjoint with those of the threshold analysis.

Figure 1: Results of conjoint analysis with/without GAP 'repair kit"



The second problem with conjoint analyses (which cannot be resolved within the system) is the linear interpolation between the attribute levels that are being scrutinized. However, there are also some tried and tested alternative techniques that apply here. Thus, for example, 'Value Sensitivity Measurement' (VSM) involves no prompts and is unlike conjoint insofar as there are no predefined characteristics, and one instead asks open questions about minimum/maximum values.

This method allows one to very precisely determine critical thresholds where the assessment of a given attribute is likely to radically alter.

Linear interpolation can mean that conjoint analysis makes flawed recommendations.

It is of course also vital here that the thresholds and indifference zones for each quantitative attribute should be investigated before the actual conjoint sequence so that they can subsequently serve as correction factors. It requires considerable effort to actually implement this step, but it's easy to illustrate the procedure that's used to merge the conjoint and VSM results.

Conjoint analysis identifies individual points (Figure 1) which are then usually linked by a straight line (linear interpolation). Conjoint analysis on its own might therefore produce an optimum hp of 150 for the car (Optimum A), because this is where 'willingness to pay' is highest and cannot be further increased via additional hp.

The GAP repair kit can be combined with any conjoint approach.

However, one arrives at a totally different picture if these values are combined with the findings of a previously conducted Value Sensitivity Measurement (Figure 2). VSM produced two threshold values at 100 and 200 hp; these findings are now used to ascertain the values between the points identified within conjoint.

GAP seamlessly combines the best of both methods.

One ends up with the 'step function' that is typical of pricing psychology. This makes it clear that there's already an indifference zone above 100 hp in which customers' willingness to pay is no longer strengthened by further increasing the hp figure. So whereas conjoint recommended Point A (car with 150 hp), the combination with VSM demonstrates that Point B (car with 100 hp) is optimal.

The concrete recommendations that can be deduced from this combined analysis would not have been identifiable from the interpolated conjoint data. On the contrary, conjoint would have led to an incorrect recommendation citing an excessive hp figure.

GAP constitutes a simple stratagem that is nonetheless complex to implement in mathematical terms.

We are therefore dealing with a simple stratagem that is admittedly much more complex from a mathematical perspective because the thresholds and indifference zones have to be projected onto the individual partial utility profiles. Nevertheless, it’s definitely worth taking the trouble to conduct this analysis because it seamlessly combines the best of both methods: the valid point analysis of conjoint merged with the realistic threshold analysis of VSM.

This allows one to deduce wide-ranging recommendations which wouldn't have been clearly identifiable with either of the approaches on their own. By using the partial utility sensitivities that have been ascertained in this way it's likewise possible (as is the case with classic conjoint) to simulate the impact of attribute levels that haven't been directly tested, albeit now with much more reliable results.

GAP can retrospectively eliminate the errors inherent in conjoint analysis.

When it comes to this cognitive distortion, the initial situation is thus similar to the emotionally determined distortion: we're dealing with a stable effect which is ignored in conjoint analyses despite being extremely relevant in practice, but which can easily be quantified via other methodological approaches.

GAP enables valid and realistic recommendations for action.

The 'General Algorithm for Patching Conjoint Analyses' efficiently repairs or 'patches' the key cognitive and emotional distortions that arise within conjoint analyses, thereby allowing much more valid predictions because it closes the gap between the textbook decision situation within conjoint analysis and the realities of actual purchase behavior. It's particularly advantageous that GAP can be universally combined with any conjoint approach.

Recommendations can only be optimized by combining both approaches.

This means the tool can be used with any conjoint variant as well as any conjoint software where individual partial utility and preference values are calculated, outputted and inputted. It can also be used to extend future versions of conjoint analysis (such as the new 'menu-based conjoint' approach).