Bias and A/A Testing

Identify potential biases in the proposed experiments.

1. **You're testing advertising emails for a bathing suit company and you test one version of the email in February and the other in May.**

There is a bias in assignment to conditions related to season and geography: Depending on the geographic location of email recipients, emails could be received during the winter (Feb) and just prior to summer (May), or during the summer (Feb) and fall (May). The timing of the email conditions exists within an environmental context that could affect recipient interest levels in bathing suits.

2. **You open a clinic to treat anxiety and find that the people who visit show a higher rate of anxiety than the general population.**

There is a bias in populations. Since it is highly unlikely that people without anxiety will want treatment for a condition they do not have, the sample is biased. It will be more symptomatic than the general population.

3. **You launch a new ad billboard based campaign and see an increase in website visits in the first week.**

There is a time and exposure bias. It's possible that the first week's exposure to the billboard campaign is due to initial curiosity, or environmental relevance that makes the content particularly salient. Maybe there is an upcoming event - a music festival, concert, or conference.

Subsequent week's visits could decline significantly depending on billboard placement: if it is near a route frequented by commuters, for example, they might tend to "tune out" its presence.

Or, if the billboard is placed where there is significant unique traffic (not commuters), exposures might be sustained over time. One week of seeing increased website visits may not be a sufficient period of time to determine effectiveness of a billboard campaign.

Also, due to the type of exposure (offline), there is no way to isolate and track the source of increased website traffic as a direct result of the intervention (new ad billboard campaign).

As a result, the increase in website traffic could be related to an increase in organic searches, some unknown event or other type of publicity that could not be accounted for (news, media mentions or public focus on a topic that increases searches for your business domain). In other words, the increase in website traffic could be a coincidence and not related to the billboard campaign. There's no way to know.

4. **You launch a loyalty program but see no change in visits in the first week.**

The structure and design of the loyalty program would likely need to be broken down into smaller chunks to test parts of it to see how well the parts do within the context of the whole.

"Loyalty" is a vague concept, not a clear metric. And there are no clear outcomes that make sense.

Potential "loyalty" definitions could include: purchases within a specified time frame, specific kind of purchase (a monthly subscription plan), community engagement in forums, rating of products, answering surveys or responding to other user questions.

Then, based on the definition of loyalty, specific kinds of information could be collected to determine if the loyalty program was successful.

Also, the specified outcome is vague. Having an end goal of increased website visits in and of itself seems to be a poor end measure.

Why do you want to increase website visits? Do you want subscribers commenting/discussing products for user engagement/community building? Are you looking to increase awareness of a new product that competes with a rival brand?

There is a time bias and there are potentially numerous confounding variables that could affect the ability to measure the impact of a loyalty program.

Loyalty programs are likely to be slow growth initiatives that have a greater impact over sustained periods of time. As a result, one week is likely not a sufficient period of time to determine the effectiveness of its launch.

Examples of confounding variables:

Depending on the product, the loyalty program might require subscribers to visit your brick-and-mortar store to check out your products in-person, so they don't actually go on the website to sign up.

Launching the loyalty program may not be a motivation in and of itself for a subscriber to take a specific action (go to your website). There's no immediate reason to drive a user to the website.

If the program were combined with a compelling reason to visit the website, then it might be a better indicator of initial interest in the loyalty program.

A compelling reason might create some kind of scarcity (ex: you can only join this loyalty program that benefits you in x way if you sign up within the next 72 hours).

Or, maybe some kind of incentive (when you buy 2 of our gadgets, we'll give you y gift). But then, it's not clear if people are signing up for the loyalty program just because it was a great incentive, but they're not really interested in the loyalty program.

Again, defining "loyalty" more clearly and then breaking down the loyalty program into more discrete steps may offer more effective ways to determine impact of a loyalty program.