Human Cognitive Principles Supporting Design Recommendations for a QSR Mobile App

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Introduction:

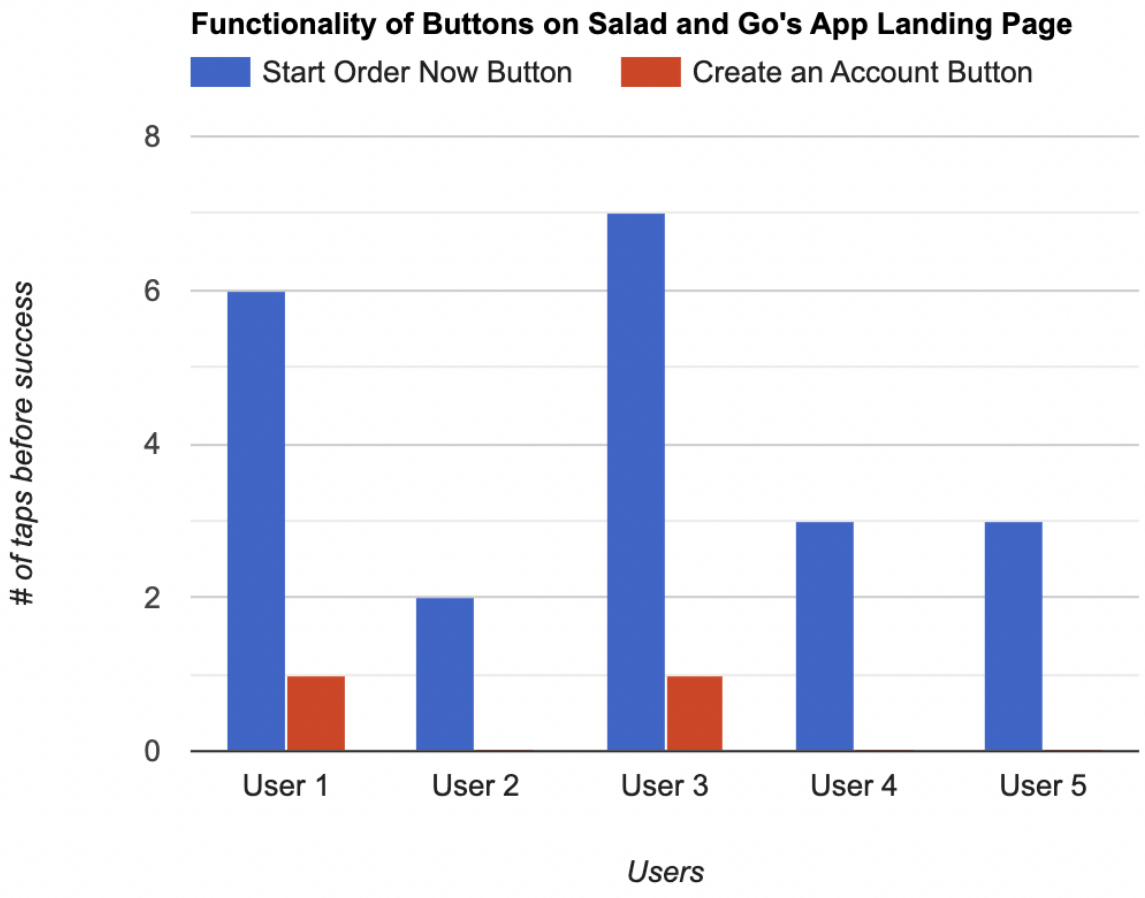
Product: The product I chose is the mobile app for a QSR (Quick Serve Restaurant) known as Salad and Go. Salad and Go was created in Arizona but currently has less than 100 locations across Arizona, Texas, and Oklahoma, and they are known for their mission to revolutionize access to healthy food by serving cheap and freshly-made salads and other healthy items (teas, wraps, burritos, etc.) through fast service in the form of a drive-thru. The main goal of the app is to place a pickup order for the user to retrieve themselves from any Salad and Go location of their choice/convenience, and it is important to note that it is not integrated with any third-party delivery services (i.e. DoorDash, UberEats, etc), meaning that this app contributes strictly to a Business to Consumer (B2C) business model.

Task: The task I observed users complete was to use the app to place a single pick-up order for 1 salad of their choice with any 3 modifications. Specifically, these users will be new to the app and have never used the interface before, so it will start with them on the landing page and should end with them proceeding to the checkout screen. I chose this task because it pertains to the main goal for why people would use this app and therefore I can observe what are the current issues in the user flow that need to be addressed.

Observations:

I observed a total of 5 users engaging in said task. I found that the biggest issue in the user flow was on the landing page, where all users had to start from the beginning of this task. On this page, users must choose to click one of three buttons in order to proceed: Start Order Now, Create an Account, and Log In. However, because all users have never used this app before, it's important to note that 0% of them clicked the "Log In" button.

Specifically, I noticed that 100% of users experienced a functionality problem with the “Start Order Now” button. I observed this was the first button that all users clicked because it is the top-most button that is visible on the screen. Specifically, this button always has a very delayed response, meaning that it doesn't work on the first click and would take multiple clicks afterwards until the user would be shown the next screen in the user flow, which was finding and setting a Salad and Go location to pick up from. There were some instances where users were frustrated and tried clicking the “Create an Account” button - even though that’s not their initial goal - and it was immediately successful after only one click. The chart below shows the amount of taps each user took before the screen change, depending on the button they clicked:



Psychology Foundational Principles:

Product: Salad and Go Mobile App

Psychology Topics: Signal Detection Theory, Visual Search, Neurological Loop (Cue, Routine, Reward), Hick's Law, Memory

Principle 1: Signal Detection Theory

> **Signal Detection Theory**: *When a person sees a picture of a food item on the Salad and Go app, they must be able to identify if it is either a static image or an interactive component that will allow them to complete the task/place an order.*

Signal Detection Theory tests if people can find a signal amongst noise. The signal can either be present and identified successfully as a "hit", but a person might mistake there being a signal when there is none in reality and therefore is defined as a "false alarm" (Lee et. al, 2017). Specifically regarding "false alarm" signals, Weger explains the varying levels of negative consequences people can face when they identify a false alarm. In his example of a cop and a fugitive, if the cop assumes a false alarm and decides that the fugitive is holding a gun (when in reality it's a cellphone), this can lead to dangerous outcomes such as shooting and injuring/killing the contextually innocent target (2020). While this is an extreme example of what happens when a person believes they've detected a signal that actually doesn't exist, this still rings true to the reality that false alarms in a design ultimately put a damper on the over user experience of an interface/product, no matter how drastic it is. In the context of the Salad and Go app, I noticed that 40% of my users had mistaken a large overhead image of a salad on the sub-menu Salad page for being clickable, and had therefore tapped it thinking it would lead them to a new page or action. Although the result of this false alarm was just realizing that the image was just an image and not interactive at all, the user's time had been wasted for no reason - even

for just a few seconds. Confusion by the user, however brief, is still an unnecessary negative experience at the end of the interaction and can be easily fixed via the user interface design.

Principle 2: Visual Search

> **Visual Search**: *When a person is scrolling through the Salad and Go app to find a specific kind of salad they want to order, they must scan over all the options until they reach their target.*

Visual search gives a purpose or goal to what our eyes and brain are looking for. This is a natural human instinct to simply see things, but the act of searching for something specific can be motivated by certain things from our external environment, like out of fear, curiosity, etc. Whatever that motivation might be, the Guided Search model assists people in finding their targets via the top-down response to matching the element they're using to specify their search to their designated target (Eckstein et al., 2000). An example of this is the Salad and Go app's sub-menu Salad page, where someone might want to specifically find the Classic Caesar Salad. The person most likely will be reading the label of each salad display until they find the literal words that match, but in the current layout, all images of the salads themselves and their frames look nearly identical. Meaning, they all have the same orange bowls, box frames, and green pencil icon under their frame that takes up an unnecessary amount of space. 1 out of 5 of my users scrolled up and down this page 3 times before finding the salad they wanted, exclaiming that "they all look the same". So, while the Guide Search model can help people find specific targets amongst other elements in a group/crowd, it might not be the most helpful when they all look too similar. What more is that with saccadic eye movements, serial visual search is impacted by restricting eye movements in that it leads to an increase in error rates (Findlay &

Gilchrist, 2003). This is relevant to my product because saccadic eye movements are for scanning content, which is what people must do to navigate through all the food options so that they can create an option. Since the eye movement is already very restricted to scanning over a small screen (in comparison to a tablet and desktop screen sizes), this further contributes to how it might be slightly difficult for people to be able to easily identify their target food selection.

Principle 3: Neurological Loop (Cue, Routine, Reward):

> **Neurological Loop**: *If people have an incentive to download the Salad and Go app that lets them get more out of the business other than simply ordering food, they might feel more attached to the product and therefore be a more frequent consumer to obtain those rewards faster*

Incentives motivate people to keep doing something, which usually benefits both the user and backend product in their own ways. According to Haruno & Kawato, to select appropriate behaviors leading to rewards, the brain needs to learn associations among sensory stimuli, selected behaviors, and rewards (2000). This relates to my product because although it is requiring its users to have an account to place an order, there is no obvious reason as to why they should. As defined by Khatib & Barki, a reward is the "outcomes of the routine that provide personal satisfaction" (2020). Therefore, because the app does not market any kind of reward or special access to something only accessible with an account, the user won't be persuaded to create an account and cannot build a routine out of it whatsoever. The current reality of the app's business model is that people who don't have an account and/or don't have the time, energy, or patience to do so are 100% prevented from using the app to complete its main purpose of buying

food from Salad and Go. This results in risking the chance of losing profit/the customer at that moment if the user decides to just not order altogether due to this inconvenience.

Principle 4: Hick's Law:

> **Hick's Law**: *If people are presented with a lot of options or steps when personalizing their order on the Salad and Go app, it may take them longer to navigate the interface and make the correct choices.*

According to Tarold O. Kvalseth, Hick's Law is one of the few law-like relationships involving human performance, which expresses choice reaction time as a linear function of the mutual information between the stimulus and response events (2021). In layman's terms, the more information is presented at a single time to a person, their decision-making process will also be elongated. This relates to my product particularly on the modifications sub-menu page for every salad - I noted that 20% of my users commented on how the collapsible sections to modify certain components of their meal seemed crowded and cluttered, despite eventually learning how to navigate the interface. In Cockburn and Greenberg's paper, they argue for a predictive model specifically targeting menu displays through application of both Hick's Law and Fitt's Law to "transition to expert performance" with users (2007). Since Fitt's Law determines that the farther and smaller the target is to the user results in a longer time to reach it, I believe using this in conjunction with Hick's Law to redesign how the modifications menus are displayed could potentially help with visual search in general (relating back to Principle 2).

Principle 5: Memory:

Memory: *People should be able to navigate the Salad and Go app relatively easily because there are familiar visual icons and copy that they may recognize from other systems from the external real world.*

Memorability is a basic cognitive concept that has important implications for the design of visualizations that will be remembered and also lays the groundwork for understanding cognitive functions like comprehension (Borkin et. al, 2016). This is related to top-down processing, which helps people navigate their environment through garnered experiences and thoughts from everyday life. Specifically in the digital age where nearly every product or business as a digital interface to operate from, it is easy to find a lot of commonalities in terms of user interface (UI) design. Specifically, the use of certain icons have become so widely implemented that in many interfaces that people tend to recognize things like a hamburger icon (3 horizontal lines on top of each other) indicates that it is an interactive component to view a menu and a pin icon, which is commonly associated with location services on an app. The Salad and Go app does a great job in using intuitive icons so that its users have a general idea where to go to do certain actions, which is directly related to one of ten Jakob Nielsen heuristic principles known as "recognition rather than recall". When that principle is applied correctly (such as in my product), the user's memory load is lighter and therefore can identify certain things faster and more accurately by using their existing knowledge with similar applications (Miller et. al, 2018).

Design Innovations/Improvements:

Psychology Topics: Signal Detection Theory, Neurological Loop (Cue, Routine, Reward)

After observing that many of my users had mistaken the overhead image of salads on the Salads sub-menu page as an interactive element, I figured that an easy solution to prevent this "false alarm" detection was to either remove the image altogether or choose a different type of image that is strictly for aesthetic purposes. Again, while this type of mistake is low-risk in that clicking the image would only lead to discovering there was no resulting action, the main incentive for making this improvement is to smoothen out the overall user experience by completely removing all distractions and misleading elements. This also attests to how the current layout and design of this menu screen is cluttered and cramped, therefore the misleading overhead image just adds to the cognitive load and extends the decision making process for the end user. Therefore, removing or changing the image on this screen and overall taking a more minimalist design approach will overall make the user's navigation process more intuitive and quick.

Additionally, the lack of incentive to use/download the Salad and Go app can be solved by adding a new "rewards program" feature that gives account holders special access to discounts, deals, and a points system that can accumulate per purchase to redeem for free food items. This would create a neurological loop in people that would motivate the user to create an account for these benefits, build a routine of purchasing through the app to save money and/or earn points, and eventually be rewarded with a cheaper or free food item in their future orders. Moreover, having an incentive or rewards program would increase engagement with the product and most likely attract more customers, therefore more profit.

Conclusion:

Overall, I had found that there were 2 main issues with the current Salad and Go app through my user tests, which were the UI design of the screens, usability, and lack of incentive to use or

download the app. Through my psychology principle research, I discovered that the reason why certain users had trouble with navigating the app was largely due to the choice in aesthetic imagery and layout format that slowed down their decision-making process. I also observed that they were frustrated by how the “Start Order Now” button on the landing page never worked on the first click, which did not give them a good first impression of the app as new users. Lastly, I had noticed an overwhelming number of comments from users on how it felt pointless to be required to make an account just to order food from Salad and Go - they were not pleased that they had to take this extra step for an unknown reason. To fix these frustrations, I conclude that these frustrations can be solved by using a minimalist and modernized UI layout design, debugging all interactive components to ensure that they all work on first click, and implementing a rewards/points program for account holders.

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