**Discussion**

In Study 1, we found some evidence in our Bayesian analysis supporting our hypothesis H1a. However, we did not find any evidence supporting H1b, either through our linear-mixed models or our Bayesian analysis. Our qualitative free-response section indicated that a substantial portion of our subjects expressed confusion regarding the experimental procedure and materials. Even so, a larger portion of our subjects expressed interest in the material, providing some indication that the intervention improved engagement.

Our primary goal for Study 2 was to provide a pseudo-replication of our Study 1 hypothesis, with improved experimental materials intended to reduce confusion. Hypothesis 1 was not supported by the results of our intervention. We recorded the exact opposite effect; our intervention condition was less effective at increasing support for UHC than our control condition. Additionally, we directly measured our two proposed mediating relationships through Hypothesis 2. The first (H2a), was if perceived equity was a mechanism that accounted for a significant portion of why an HBP would improve support for UHC. The second (H2b) was if comprehensibility was a mechanism that accounted for a significant portion of why an HBP would improve support for UHC. Hypothesis 2a was supported by the results of our intervention. The data in our sample indicated that perceived equality was a significant mediator for support for UHC. Using the bootstrapping method outlined by Tingley and colleagues (2014), we estimated that perceived equality is a significant mediator on support for UHC not just in our sample, but in the population as a whole. Our intervention condition was perceived to have lower equity than our control, which partly explains why our control condition had a greater increase in support for UHC, in opposition to Hypothesis 1. Hypothesis 2b was not supported by the results of our intervention, as there was not a significant effect of experimental condition on comprehensibility. Lastly, we intended to determine if objective and subjective numeracy would have an interaction with our intervention condition in Hypothesis 3. Hypothesis 3 was partially supported by the results of our intervention. We saw a significant effect of objective, but not subjective numeracy, on support for UHC. Furthermore, we found a significant interaction between the effect of objective numeracy and our intervention condition. Subjects low in objective numeracy had greater support for UHC in our control condition compared to our intervention condition, in opposition to Hypothesis 1. Yet subjects high in objective numeracy had greater support for UHC in our intervention condition compared to our control condition, in support of Hypothesis 1. This provides some indication that our initial Hypothesis 1 is valid, but only for subjects with higher objective numeracy.

In line with previous research, we did find that the majority (69% of our subjects) of our participants found the HBP acceptable (Goold et al., 2000; Danis et al., 2004). We also replicated the generally positive level of support found by Huebner et al. (2006), but in a non-medical student population. However, we only partially replicated previous work on the effects of active versus passive instruction (Haidet et al., 2004; Michel et al., 2009; Weiger et al., 2019). In Study 2, our intervention condition represented active engagement, and our control condition, consisting of ‘standard’ UHC messaging, represented passive instruction. We found that active learning was more effective, but only for subjects with higher numeracy. While Haidet et al. 2004, determined that active instruction was particularly effective for mathematically focused content, we contend that perhaps this effect is due to active instruction being particularly effective for individuals that already exhibit high objective numeracy. Thus, the large advantage that the more numerate have when working with numbers is exacerbated even further by active instruction. Given that our initial intention was to provide a way to bridge the understanding gap created by the high complexity of UHC, addressing the lack of impact for low-numeracy subjects is a high priority.

Study 2 provided mixed evidence regarding our mediational hypothesis. Both perceived equality as well as understanding of UHC strongly predicted support for UHC. However, our experimental intervention lowered perceived equality, and neither condition influenced comprehensibility. While we could plausibly conclude that there is partial mediation of perceived equity on support for UHC, we still have the lingering problem of our intervention not successfully improving perceptions of equity. This is a repudiation of previous research by Hurst et al., (2018) regarding the HBP framework being perceived as fair. Importantly, we were able to determine that comprehensibility is a strong predictor for support for UHC, but further research is necessary to determine how best to improve comprehensibility.

The effect of numeracy on support for UHC was quite unexpected. While we had no a-priori assumptions regarding the impacts of numeracy, objective and subjective numeracy are considered to measure two separate things. Peters (2020) writes that objective numeracy measures the ability to use knowledge of basic probability and mathematics, as well as to communicate and interpret mathematical information. In comparison, subjective numeracy represents confidence in ability to understand mathematics, and the preference for numbers over words. Considering this, it is not surprising that these two numeracies had different impacts on support for UHC. Secondly, we had assumed that the effect of numeracy would be the same across both categories. This assumption was incorrect. We saw very clearly in [TABLE HERE] that there was a significant effect of objective not subjective numeracy. Also, the impact of objective numeracy was significantly greater in our intervention than in our control. Perhaps one reasonable supposition is that without sufficiently great objective numeracy, it was difficult to engage in calculating and trading off options. An alternative supposition would be that highly numerate individuals were significantly more engaged with an exercise that let them use their numeracy, leading to more attention paid, resulting in a larger effect of our intervention.

Unsurprisingly, no individuals in our control condition had any difficulty with the very simple exercise (reading multiple fliers). In comparison, after analyzing the free response data for the intervention, it seemed very clear that the main source of difficulty was ‘agonizing’ over the optimal distribution of resources to have the most preferred health plan. Conceptually, this seems more like a feature than a bug. Confronting individuals with a realistic and difficult choice akin to those for health-care policy officials is exactly the purpose of the exercise. Additionally, many individuals in our intervention condition expressed active support and appreciation for the purpose of the exercise, that it improved their understanding of the problem and that it was a fun and enjoyable exercise. This provides further evidence that the HBP based active intervention was indeed successful at improving subject engagement. However, one consistent category of responses across both conditions expressed belief that the exercise was either politically motivated or had a strong intentional bias in its construction. This led to some subjects expressing suspicion or lack of belief in the presented information. Perhaps a reasonable extension would be to present HBP for a UHC in comparison to a set of standard private insurance plans. Additionally, it would be interesting to see how much this correlates with or against political affiliation, which was not measured in the primary study.

**Limitations**

Study 2 recruited participants from a large midwestern university located in a medium sized midwestern city. This limits the amount of generalizability to other populations. The design of Study 2 required familiarity with internet and online survey platform technology, which may make it difficult to adapt to older or less tech-savvy populations. Some subjects indicated in the free-response section that the information presented was biased towards support for UHC and did not paint the whole picture of arguments supporting our current private care system. Therefore, we were unable to derive potential insights comparing to see if positive messaging on private health care would reduce support for UHC.

**Future Directions**

The lowest-hanging fruit is a replication of the study, providing further evidence of our proposed mediating relationship and moderating effects, on a group that more closely mimics the insurance buying public. This would provide additional external validity to the study, as the primary decision-makers around health insurance are not university students. Something that would also be very simple for any replications or pseudo-replications of this research moving forward, would be to develop a structured plan for qualitative analysis. A potential avenue would be to use various forms of semantic text analysis, LIWC specifically.

Additionally, there are several modifications of the experimental materials that would be of interest to examine. One example would be to determine if different allotments of resources would have greater or lesser support as compared to our current allotment of 49 units out of 79 potential units. If there is no significant difference in either greater or lesser amounts, that would perhaps provide evidence indicating that the structure of the UHC as presented through a HBP is has greater salience in determining approval versus simply the objective healthcare options available.

There are other additional measures that would be worthwhile to measure as well, to see if there are any moderating effects. Our naive qualitative analysis indicated that many participants were skeptical of a potential political agenda from the researchers or were otherwise concerned about the ‘neutrality’ or ‘objectivity’ of our material. This would be something we could examine by measuring political orientation and polarization. Related to our previous point, we could also design experimental material that explicitly promotes ‘standard’ private health insurance as it exists in the US or compare to negative messaging on ‘standard’ private health care without having positive information about UHC. Lastly, if we could find some way of measuring actual equity of a given plan, we could examine whether different distributions of elements in a plan (actual equity) have similar effects to perceived equity of UHC.

Lastly, the main thing of value to explore next would be to determine to see if there is some execution of the HBP that would be similarly effective to our current one, with individuals that have lower objective numeracy. Low objective numeracy is common in the US population. Having an intervention that does indeed work to increase support for UHC only in individuals with high-objective numeracy is definitionally a problem with regards to the scope of the population that we wish to influence. Some considerations would perhaps be a simplified version of the exercise, or to clearly indicate the trade-offs using a computer activity that does not explicitly reference numbers or calculation.