Impact of Explicit Health Benefits Package on Support for Universal Health Care

Masters Thesis

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Introduction

Universal Health Care is important because it addresses two issues in medicine. Access to universal care addresses the issue of equity and helps bridge the gap between marginalized and privileged groups with regards to healthcare outcomes. Additionally, universal health care programs in general focus on cost-effectiveness of care, leading to more efficient use of resources. Universal health care would likely benefit America if implemented. However, there is a significant lack of support for Universal Health Care. Thus, improving likelihood of implementation by improving support for UHC is valuable.

Opposition of UHC in the U.S. hinges on several issues. The first is that it is impossible to quantify improved support for UHC without consensus as to what UHC is. To give an example, it would be reasonable to assume medical students understand health care and its distribution. Surprisingly, this is not the case! These students struggle to answer questions regarding UHC due to divergent beliefs as to exactly what 'universal coverage' means (Huebner et al. 2006). Secondly, without a framework for what care is to be distributed through UHC, rationing of limited health resources is haphazard and arbitrary. Indeed, the main mechanism through which racial prejudice predicts decreased support for UHC in the U.S. is 'unfair' disbursement of resources to undeserving minorities (Shen and Labouff 2016).

Looking at successful UHC programs in other westernized first world countries (UK, Canada, etc.) these issues are addressed by the usage of a 'explicit health benefit plan' (HBP). An explicit health benefit plan is best defined as "a set of services that can be feasibly financed and provided under the actual circumstances in which a given country finds itself" (Glassman et al. 2016). While reaching consensus on the exact terms of the HBP is not a small process, an explicit HBP ensures that there is little room for confusion regarding what is covered. There are very clear boundaries set for what care the government can subsidize. In doing so, concerns regarding fairness are strongly mitigated. Furthermore, studies have shown that an explicit HBP can also improve efficiency in resource allocation, create explicit entitlements for patients which help prevent marginalized individuals from being excluded from care, and reduces arbitrary restrictions on access and services (Glassman et al. 2016).

Additionally, it is important to explore what is the best way of exposing participants to an HBP. Previous research indicates that a simulated experience exercise can have more impact than simply being told facts (Wegier, Armstrong, and Shaffer 2019). Another improvement over our pilot study is replacing our uninformitive control with 'standard' messaging supporting UHC, adding additional external validity. Furthermore, our new 'standard informational intervention' hews more closely to the methodology for a control presented by Wegier et al. (2019).

Review of Literature

Inadequacies with our current system

Health care in the United States, as it is now, is very broken. The purpose of health care is to improve the well-being of those treated. However, until the passing of the 2010 Affordable Care Act, medical expenses were the most common cause of bankruptcy in the United States (Galvani et al. 2017). Indeed, there are several conceptual problems with a 'competitive marketplace' of multiple insurers. Galvani et al. (2017) notes, it is hard for a private insurance company to justify preventative care, as "future benefits could accrue to another insurance provider. The result is a systematic undervaluation of preventative measures." In fact, looking at our closest analogue for a broad public health option, Medicare and Medicaid, we find that billing rates and expenses for private insurance are up to six times more expensive! Simply put, medical care is unaffordable in the United States for many individuals.

Perhaps another way of looking at the issue is to consider health outcomes, instead of cost for health. However, even looking at the United States from this perspective, Galvani et al. (2017) finds that our life expectancy has been reversing since 2014, even as money spent on health has increased by 130%! Delving deeper, we see that even the care we deign to deliver is problematic. Manchikanti, Falco, and Boswell (2010) find that "almost 50% of our care is not evidence based" and "as much as 30% of our spending reflects care of uncertain or questionable value." It is thus trivial to conclude that our current system is broken. Fortunately for the United States, Universal Health Care cleanly answers these issues and has been put into practice for decades in many other first world countries.

Benefits of Universal Health Care

Before delving into the proven benefits of UHC in other contexts, it is important to define exactly what we mean by saying "Universal Health Care." A resolution adopted by the UN General Assembly states that UHC is "access to key promotive, preventive, curative, and rehabilitative health interventions for all at an affordable cost" (Assembly 1991).

One significant benefit of UHC is that it ensures continuous enrollment in a health care plan. Galvani et al. (2017) finds that uninsured individuals have a 40% elevated risk of mortality. Additionally, for individuals who have chronic conditions, significant barriers to re-engagement exist under 'traditional' insurance plans. Improvement in coverage is so great, that a study done by Panpiemras et al. (2011) found that within one year of the implementation of UHC in Thailand, the percentage of the population insured surged from 40% to 97%. It is likely that implementation would indeed lead to a significant reduction of un/underinsured Americans.

Merely improving quality of health would be extremely exciting, but UHC also is effective at reducing waste and cost in the health system. Compared to a similar country, Canada, we find that 25% of our total medical cost is administrative, more than twice what the percentage is under Canadian UHC (Galvani et al. 2017)! By transferring to a single payer option, Manchikanti et al. (2009) note that UHC results in savings "large enough to pay for most of the additional utilization by those previously uninsured." To look at another example, we can consider Jamaica. Their UHC program reduced sick days by 34%, leading to productivity gains that dwarfed the additional cost in healthcare, essentially producing pure value (Galvani et al. 2017). Another thing to note is that the collective bargaining power that comes from a UHC system cannot be downplayed. Manchikanti et al.(2009) finds that while we use 10% fewer drugs per capita than other OECD countries, our prices are somehow 50% higher for equivalent drugs! An extreme example can be found when looking at the recent price spikes for toxoplasmosis drugs, a 5500% increase, and EpiPens, a 791% increase, which has not occurred in Europe or Canada. This is due to both countries able to collectively bargain for drug prices due to UHC (Galvani et al. 2017). We can clearly see that UHC both improves health outcomes and is cheaper to implement than our current system. Yet, as UHC has not been implemented in the U.S., we must look at why there is opposition.

Opposition and Support to Universal Health Care

Looking at the subset of literature detailing support for Universal Health Care in the United States specifically, we find two main aspects that explain opposition to UHC. Huebner et al.(2006) examined how US medical students feelings towards UHC change from their first to their fourth year. Surprisingly, the researchers found significant confusion when designing the questionnaire. Medical student focus groups struggled to come to consensus on terms related to UHC such as "fee for service," "managed care," "single-payer," "multi-payer," and "universal health care." Furthermore, the authors note that 'complex policy terms' were not able to be defined in the questionnaire, which indicates a need to explain the concepts of UHC without necessarily using an informational intervention. Without a clear understanding of what exactly these terms mean, and what is being offered in a UHC program, it is impossible to accurately gauge support or opposition. Additionally, given that medical students would be assumed to have a greater understanding of these medical-adjacent terms, it stands to reason that the confusion would be even greater for members of the general populace.

Shen et al. (2016) chose to look at the issue of opposition to UHC from another aspect, whether racism describes why there is a lack of support for UHC. The authors hypothesized that Whites oppose government programs designed to eliminate racial inequity because it "represents 'unfair government assistance,' such as welfare or 'free' busing." This is additionally relevant as the historically disadvantaged groups that tend to benefit from government aid have high uninsured rates compared to whites (11.7% for whites, 20.8% for blacks, 30.7% for Hispanics). Furthermore, while UHC does not directly aim at benefiting blacks, "those high in racial prejudice may assume so." Importantly, when looking to see if racism predicts opposition to UHC, Shen et al. (2016) found the surprising result that it did not predict opposition to UHC. In fact, it was the saliency of whether the individual purported to benefit from UHC was a 'free-rider,' or someone who was unfairly benefitting from UHC. This was unrelated to race. This shows that concerns with equality, equity, and fairness are most important with regards to changing attitudes towards UHC. Determining how to easily address this, as well as confusion regarding the definition of UHC at the same time is a challenge.

Addressing These Issues with a Health Benefit Package

The concept of a Health Benefit Package, as studied by Glassman et al. (2016) neatly addresses the previously mentioned issues with opposition to UHC in America. Definitionally, what makes a HBP a HBP is three factors. First, HBPs are a portfolio of multiple services, as compared to single services or a category of care; this allows direct assessment of effectiveness across each category. Second, HBPs are costed using actuarially informed estimates of supply and demand. Third, HBPs constrain the services made available through the public health system, but in doing so, guarantee that at least certain services will be made available. Through these three mechanics, Glassman et al. (2016) finds that there are clear benefits in countries that adopt a HBP for their UHC. As the system creates explicit entitlements for patients, it reduces confusion as to what is being offered and ensures fairness and equity, by preventing discretionary variation in access to care that would otherwise be largely determined by clinical professionals. Since the categories are costed and explicitly budgeted for, an HBP facilitates adherence to budget limits, "which might otherwise only be attained through arbitrary restrictions on access and services," which clearly speaks to the issue of fairness and equity. Furthermore, setting transparent criteria on what services are to be offered with the resources available allows a proper debate to take place regarding the objectives of the health system, what should be prioritized, and how good performance should be determined. This improves perceptions of fairness and equity within the medical system.

While HBPs address issues that would lead to opposition to UHC in the US, HBPs have furthermore been shown to be a key factor for success of UHC in other countries as well. An economists' declaration published in the Lancet states a belief that UHC means "ensuring that everyone can obtain essential health services at high quality without suffering financial hardship" (Summers 2015). Yet the economists themselves realize that "resource constraints require individual countries to determine their own definition of 'essential'." This speaks directly to the practical issue of universal health needing limits to be effective. In fact, looking at countries that have UHC without an HBP linked to cost, such as Ghana, Uganda, and Peru, we find significant fiscal imbalances and implicit rationing, reducing overall quality of healthcare outcomes (Glassman et al. 2016). Looking at a parallel situation of how cancer care is managed in the U.S., Chalkidou, Marquez, and Dhillon et al. (2014) find that a HBP like framework is essential, as evidence or guidelines towards care (an UHC

without an HBP) are unlikely to improve efficiency and quality of care without "the support of institutional, and legal frameworks" (UHC with an HBP). Given that we have shown that our issues with UHC in the U.S. can be addressed by an HBP, it then stands to reason that we must determine the best methodology for exposing our population to an HBP.

Communicating the Health Benefit Plan

When communicating the essence of an HBP, it is important to ensure that what is being presented is clear and easy to understand, as well as emphasizing the necessary nature of tradeoffs or compromises in medical care. Developed by Goold et al. (2005), the Choosing Healthplans All Together exercise exhibits these traits perfectly. The central tenet of the CHAT exercise is to use a 'gamification' of what actually occurs when deciding insurance spending; Participants chose components for their own health plan, by selecting categories of services at various levels of 'rationing' (e.g. generics instead of name-brand drugs, copayments, etc.). The purpose of the exercise was initially to help explain how trade-offs in medicine are necessary, given limited resources. Conveniently, the final chosen plan is clear and explicit in what care is offered and at what level, neatly answering the issue of consumer confusion at the specifics. Another factor is that CHAT is understandable, with a stunning 97% of participants finding the task easy to do (Danis, Biddle, and Dorr Goold 2002). Furthermore, the CHAT exercise has been adapted twice to the specific scenario of a government funded health plan. The first, by Danis et al. (2004), was letting Medicare enrollees come to a consensus on what services they prioritize, under the financial restraints of government funded Medicare. While a sizeable portion of participants felt that what was chosen was different than what they would have chosen for themselves (41%) surprisingly, 86% were still satisfied with the plan they got. The second adaptation, by Hurst, Schindler, and Goold (2018), was looking at what types of care that Swiss citizens' citizens would prioritize in their already extant HBP. The participants had no trouble using the exercise to improve their understanding of the Swiss HBP, were easily able to make trade-offs and set priorities, and found "the degree of consensus despite differing opinions surprising and valuable." Lastly, the CHAT exercise is particularly valuable in that it is a hands-on exercise as compared to a simple informational intervention. Work by Wegier et al. (2019) found that a simulated experience lead to more accurate understanding of information as compared to simply being given explicitly described statistics. Thus, it will likely be even more effective than a simple 'fact sheet' for an HBP that would otherwise be presented to the public.

Pilot Study

We initially ran a pilot with a more complex experimental condition, and a 'uninformative' control. Our first hypothesis was that exposure to an explicit health benefit package will improve support for UHC as compared to a control. Our second hypothesis was that the impact of exposure to an HBP on support for UHC would be moderated by whether the exposure was informational or experiential. The purpose of our pilot study was to test our experimental materials, to replicate past research on the usability of the CHAT paradigm, and find preliminary data supporting our hypothesis.

Summary of Pilot Study Results

Using frequentist methods, we found no statistically evidence at an alpha of 0.05 confirming our initial hypotheses. There was an interaction that trended towards statistical significance between our time measure and our intervention condition, which provides some support for our first hypothesis. Using Bayesian modeling, we found weak evidence supporting our first hypothesis, given a large range of uncertainty in our point estimates of support per condition. Lastly, our simple two-sample t-test found no difference between our two intervention conditions, B and C, when seeing which group would accept/reject the proposed health benefit plan for themselves.

Primary Study

As a follow-up to our pilot study, the primary study directly addresses the initial concerns indicated in our previous research. One concern that arose while running our experiment was that our control condition

did not contribute any external validity. Because of this, we chose to change our 'control' condition in our planned study to more closely reflect 'standard' UHC messaging that subjects would see in the world around them, instead of a filler 'dummy' exercise.

Additionally, our free-response section indicated that some subjects had trouble comprehending the instructions. Several occasions occurred where the participant asked the administrator how to complete the exercise after being exposed to the instructions. Improving our instructions and/or simplifying the task was necessary before implementation of our primary study. We resolved this concern by adapting our pen and paper exercise into an easy to use web applet.

Method

Participants

Participants were students enrolled in the Psychology 1000 course at a large midwestern university. Our study fulfilled 1 credit requirement for students in the course, of which students were required to obtain 7 credit hours. Participants were not given any other incentive for participation in the study. Randomization to different conditions was determined within the online survey software used to deliver the pre and post test measures. Our total number of participants was 412. This study was advertised on the university credit hours tracking software alongside other qualifying studies, but received no other advertisement.

```
demog<-UHC[,c(25:28,15)]

demog %>%
  tbl_summary(
    by = condition,
    statistic = list(all_continuous() ~ "{mean} ({sd})",
                     all_categorical() ~ "{n} / ({p}%)"),
    digits = all_continuous() ~ 2,
    label = School_Year ~ "School Year",
    missing_text = "(Missing)",
    sort = list(everything() ~ "frequency")
  ) %>% add_p() %>% bold_labels() %>% bold_p ()
```

Characteristic	**Control**, N = 195	**Intervention**, N = 217	**p-value**
Age	18.68 (1.75)	18.84 (2.08)	0.3
(Missing)	1	2	
Gender			>0.9
Female	127 / (66%)	146 / (68%)	
Male	64 / (33%)	68 / (31%)	
Gender Variant/Nonconforming	2 / (1.0%)	2 / (0.9%)	
(Missing)	2	1	
Race			>0.9
White	153 / (78%)	161 / (74%)	
Black	14 / (7.2%)	16 / (7.4%)	
APAC	7 / (3.6%)	10 / (4.6%)	
Other	4 / (2.1%)	7 / (3.2%)	
White,Black	3 / (1.5%)	6 / (2.8%)	
White,Hispanic/Latino	2 / (1.0%)	5 / (2.3%)	
White,APAC	3 / (1.5%)	3 / (1.4%)	
Hispanic/Latino	2 / (1.0%)	3 / (1.4%)	
White,American Indian/Alaska Native	2 / (1.0%)	3 / (1.4%)	
APAC,Hispanic/Latino	1 / (0.5%)	1 / (0.5%)	

Characteristic	**Control**, N = 195	**Intervention**, N = 217	**p-value**
APAC,Other	1 / (0.5%)	0 / (0%)	
Black,American Indian/Alaska Native	0 / (0%)	1 / (0.5%)	
Black,Hispanic/Latino	0 / (0%)	1 / (0.5%)	
White,Black,American Indian/Alaska Native,Hispanic/Latino,Other	1 / (0.5%)	0 / (0%)	
White,Black,APAC	1 / (0.5%)	0 / (0%)	
White,Other	1 / (0.5%)	0 / (0%)	
School Year			**0.027**
Freshman	152 / (78%)	154 / (71%)	
Sophmore	24 / (12%)	41 / (19%)	
Junior	11 / (5.6%)	19 / (8.8%)	
Senior	7 / (3.6%)	1 / (0.5%)	
Other	1 / (0.5%)	2 / (0.9%)	

Materials and Procedure

Each participant begins clicking a link to the online survey software "Qualtrics," which is used to distribute every element in our study. The singular pre-test measure is a single measure of support for universal health care (UHC). This is a 4 item measure of support for UHC, adapted from Shen & Labouff (2013) that is taken as a simple average, with the third item reverse scored. Each item was selected using a sliding scale that went from 0 (strongly disagree) to 100 (strongly agree). Cronbach's alpha for the items in this measure was ##INSERT ITEM HERE##.

After the pre-test measure, Qualtrics randomizes our participants to either our intervention or control condition. Participants in our intervention condition were directed to a web-exercise adapted from the Choosing Healthplans All Together (CHAT) paradigm developed by Danis, Biddle, and Dorr Goold (2002) . CHAT consists of participants designing their own Universal Health Care plan by trading off limited "points." Most groups of medical care are represented, costing different amounts of points. Some care options also had greater levels of intensity offered for correspondingly higher amounts of points. As compared to the pilot study, the web-exercise for our intervention condition requires no mathematical calculation and is much simpler to administer. Participants in our control condition were directed to 'traditional' messaging on the benefits of UHC, as presented from trusted sources including the World Bank and the World Health Organization. For either condition, the subjects are asked to consider how the universal health care would affect their own lives.

Afterwards, participants receive a post-test measure, consisting of two main items. The first is a post-test measure of support for UHC, using the same items as the pre-test measure. The second item is demographic information, including sex, age, and current year of schooling.

Finally, our participants read a one page paper debriefing them of the purpose and theory behind the research, and is then granted 1 credit in the Psych 1000 system. This entire process should take 20-25 minutes on average, as evinced in our pilot study.

Design

This experiment is best described as a multi-level model. The multi level structure consisted of UHC measures (either pre or post intervention), nested within each subject. The experiment was thus a 2x2 between subjects design. While our time variable (pre or post intervention) is 'within' our subjects, any given subject will only be exposed to one of the experimental conditions, thus it is 'between' subjects. The first '2' is our independent variables of time of measurement (pre or post intervention), the second '2' is our two experimental conditions, the control and the intervention. Our dependent variable was support for UHC. I believe that there should be no extraneous variables that might influence our results.

	Frequentist Model
Control	68.38*
	[65.13; 71.64]
Intervention	64.84*
	[61.75; 67.92]
Post-Measurement	1.90*
	[1.29; 2.52]
Interaction of Interevention and Post-Measurement	−2.06*
	[−2.93; −1.19]
AIC	6738.76
BIC	6767.04
Log Likelihood	−3363.38
Num. obs.	824
Num. groups: Subject	412
Var: Subject (Intercept)	518.09
Var: Residual	40.15

* 0 outside the confidence interval.

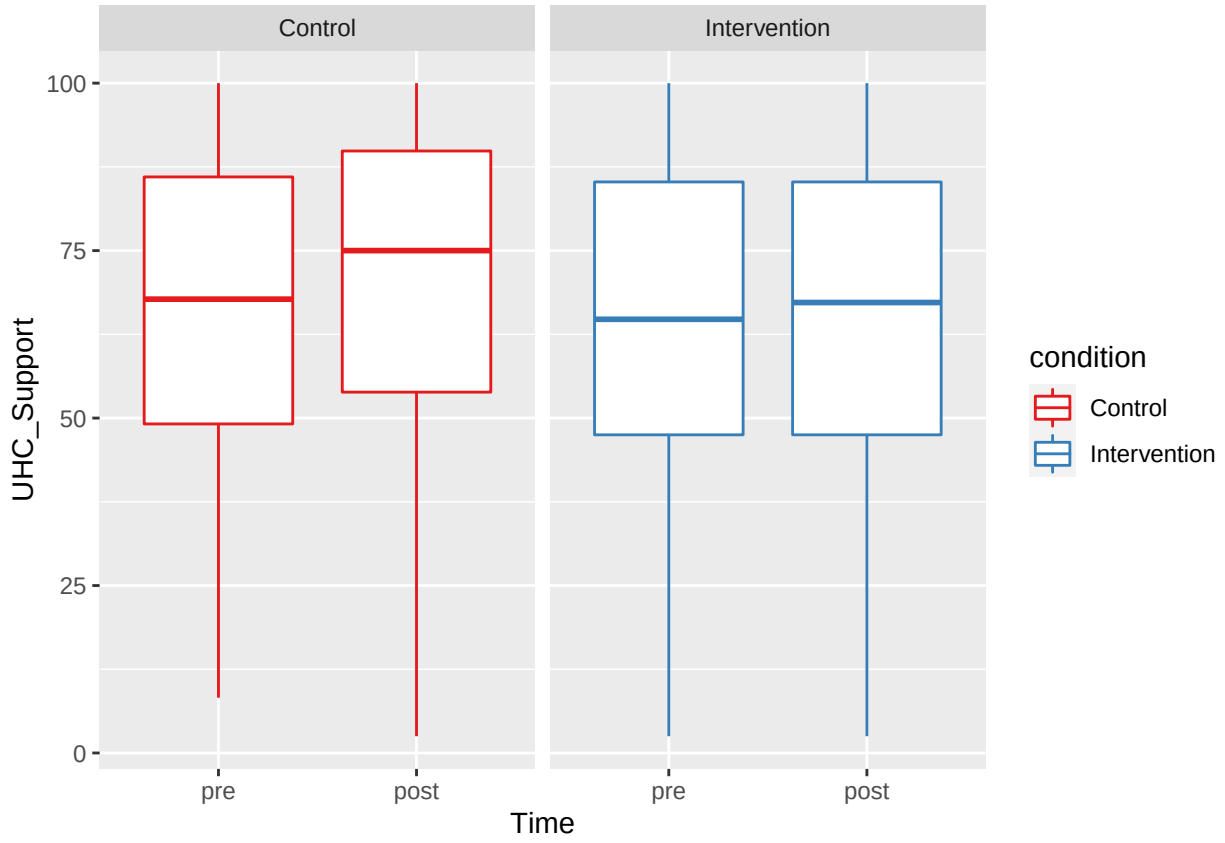
Table 2: Frequentist Table of Intervention on UHC

Modelling

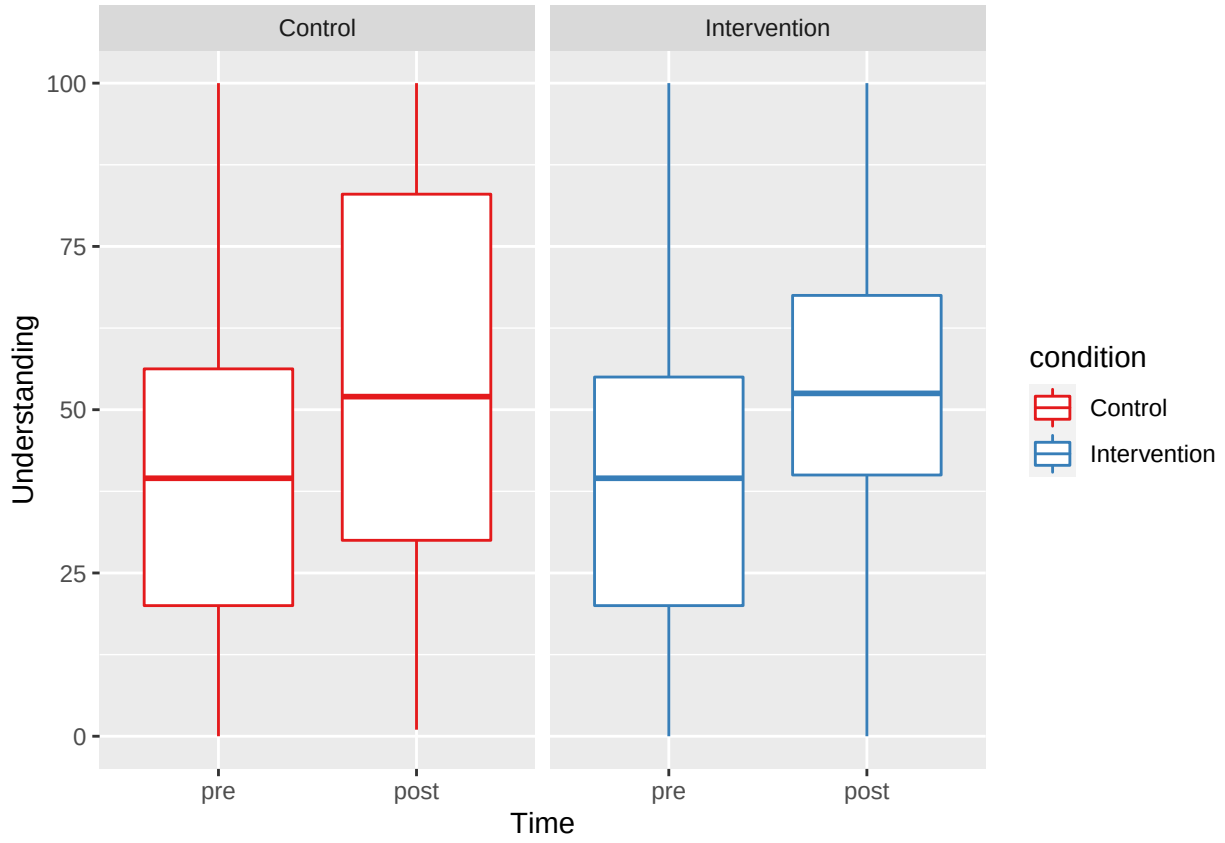
##??? I plan to employ two sets of models. One standard frequentist model, accounting for the multi-level nested nature of our repeated measures. Our other model will be a Bayesian model. A special model detail of importance is choosing a prior for our cumulative multinomial regression, of a normal distribution with a mean of zero, and a variance of 4. This was chosen so as to mimic the nature of our log-odds being akin to a z-score, with ranges outside of 4 not having much meaning than one at 2.5. Our main results that we will attend to will be seeing if the variables that we have hypothesized having an effect on support for UHC are statistically sigificant, and from the Bayesian perspective, seeing how much uncertainty we see in our estimates. ##???

Results

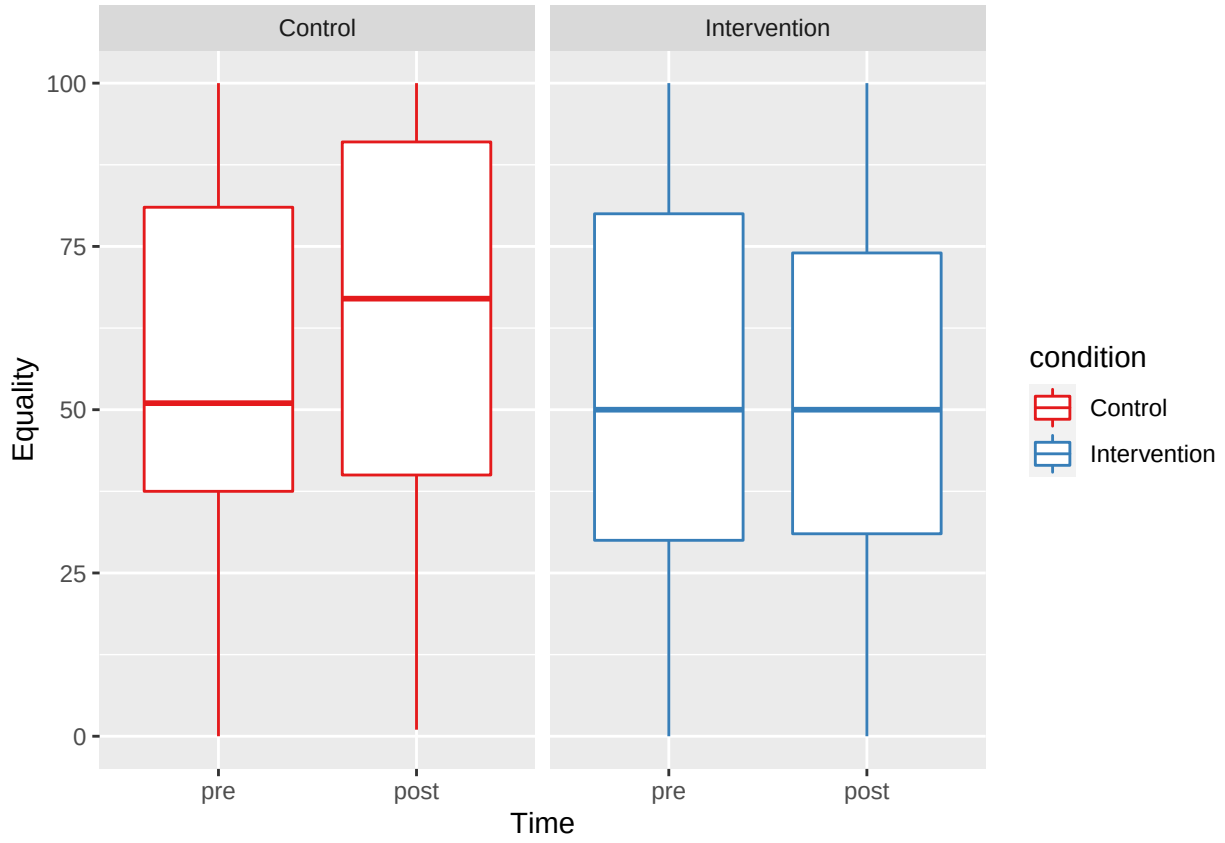
```
m1 <- lmer(UHC_Support ~ 0 + condition*Time + (1|Subject), data    = UHC_model_long)

#plot3<-ggplot(UHC_final, aes(x=variable, y=value, shape=condition, color=condition)) +geom_boxplot()
#plot3 + facet_wrap(~ condition)
#ggplot(UHC_final, aes(value, fill = variable)) + geom_histogram(binwidth = .5) + facet_grid(condition
```




```
plot2<-ggplot(UHC_model_long, aes(x=Time, y=Understanding, color=condition)) +
  geom_boxplot()
plot2 + facet_wrap(~ condition) + scale_color_brewer(palette = "Set1")
```




```
plot3<-ggplot(UHC_model_long, aes(x=Time, y=Equality, color=condition)) +
  geom_boxplot()
plot3 + facet_wrap(~ condition) + scale_color_brewer(palette = "Set1")
```



Discussion

Relate Results to Past Research

Given the results of our pilot study, we expected a strong effect confirming our hypothesis.

We did find a slight effect when exposing individuals to HBP, but there was significant uncertainty regarding our result. Keeping in track with previous research, we did find that overall there was a reasonable level of support for UHC as the majority of our participants found the plan acceptable. We also replicated the generally positive level of support found by Huebner et al. (2006), but in a non-medical student population. With regards to likelihood of wanting the referenced plans for themselves, the slight positive result we obtained cleanly replicates the findings of Danis, Biddle & Goold, 2002. The majority individuals exposed to a health benefit package would be willing to use the health package for themselves. Lastly, our results were different from Weiger, Armstrong & Shaffer, 2019. According to Weiger et al. we should have expected a stronger effect with the experiential intervention as compared to the informational intervention. We neither saw a difference in support between our two interventions (as compared to each other, not the control), as well as no difference in likelihood to accept the proposed HBP for self use. However, we may find different results with an informational intervention that reflects commonly shared information about UHC, as with our currently proposed study, as compared to the informational intervention we used in our pilot. Lastly, since there was a lack of conclusiveness, there is the possibility that the mechanism underlying opposition to UHC could be different than the initial two we hypothesized. While an HBP solves very neatly the issue of 'fairness' and 'lack of explicit definition' for the program, if opposition to UHC is due to another issue, it may not ameliorate the problem. Due to this lack of conclusiveness, there is significant value in the partial replication we are proposing.

Limitations

Both our pilot study and planned study recruited or will recruit participants from a large midwestern university located in a medium sized midwestern city. This is not necessarily reflective of the majority of the insurance buying population, or those individuals able to effect change on UHC. In addition, our methodology, specifically the process of instructing our participants how to complete the pencil and paper exercise in the pilot study, was imperfect. In the free response portion of the exit survey as well as when administering the experiment, participants often had trouble understanding the instructions. Furthermore, our control condition in our pilot was a 'dummy exercise,' and we never presented supporting information for UHC using the 'standard' format or content that health organizations would use, reducing our external validity.

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