Its finally written - A Dissertation

by

PhD Candidate X

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Department of Public Health Sciences

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Abstract

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Keywords: Key 1, Key 2, Key 3, Key 4, Key 5

Chapter 1

Introduction

Aim One Define the first aim

- Subpoint 1
- Subpoint 2

Aim Two Some text for aim two

Aim Three Some text for aim three

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Chapter 2

Aim One

Define the first aim

2.1 Introduction

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Bretz, Koenig, Brannath, Glimm, and Posch [1], Cheng and Chow [2] Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

2.2 Methods

Theorem 1. *The multi-stage estimate of the treatment effect, W, for the selected dose defined as* $max(\mu_1, \mu_2)$ *is not unbiased. The bias is* $\tau\left[\gamma\psi_H\phi(\theta) - |\theta|\Phi(-|\theta|)\right]$. *The corresponding variance of W is equal to*

$$Var(W) = PQ\theta^2\tau^2\left[\gamma^2\sum_{h=H}^{1}\sum_{h^*=H}^{1}\psi_h\psi_{h^*} + 2\gamma(1-\gamma)\sum_{h=H}^{1}\psi_h + (1-\gamma)^2\right]$$
$$+ \theta\tau^2(P-Q)\phi\left[\gamma\psi_H\left(\gamma\sum_{h=H}^{1}\psi_h + (1-\gamma)\psi_H\right)\right]$$

Proof. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

□

Table 2.1: Comparing the ability of the adjusted and unadjusted t-statistic to control the one-sided type I error rate. The nominal error rate is considered to be 2.5%.

			Type III Error	Type I Error	
N	n_1	n_{1H}	Dose Selection	Unadjusted	Adjusted
80	20	5	50.12	3.24	2.64
80	20	10	47.64	3.48	2.48
80	20	20	48.68	3.92	2.68

Figure 2.3.1: This picture in no way supports the above table

2.3 Results

2.3.1 Numerical Evidence

2.3.2 Graphical Evidence

2.4 Discussion

In this section I will talk about how the application of theorem 1 controls the type I error rate at 2.5% as demonstrated in 2.3.1. Thus, to test the null hypothesis use

$$W^c = \max(\mu_1, \mu_2) - \tau \left[\gamma\psi_H\phi(\theta) - |\theta|\Phi(-|\theta|)\right] \tag{2.4.1}$$

$$\begin{aligned} Var(W^c) = PQ\theta^2\tau^2 &\left[\gamma^2 \sum_{h=H}^{1} \sum_{h^*=H}^{1} \psi_h\psi_{h^*} + 2\gamma(1-\gamma) \sum_{h=H}^{1} \psi_h + (1-\gamma)^2\right] \\ &+ \theta\tau^2(P-Q)\phi \left[\gamma\psi_H \left(\gamma \sum_{h=H}^{1} \psi_h + (1-\gamma)\psi_H\right)\right] \end{aligned} \tag{2.4.2}$$

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Chapter 3

Conclusion

In the first aim, 2 I expanded on the work of Bretz, Koenig, Brannath, Glimm, and Posch [1], Cheng and Chow [2].

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Appendix A

Supplemental Materials

A.1 Some Code

```
****************************************************
* MACROS *
****************************************************;
%MACRO MULTIRAND_SIM(SEED,MU1,MU2,VAR,CORR_COEF,N,N1,N11,SIM_NUM=2500);
PROC IML;
CALL RANDSEED(&SEED);

*SINGLE ITERATION;
*EXPECTED VALUES;
MU = {&MU1 &MU2};

*VARIANCE;
SIGMA_SQ = &VAR;
RHO = &CORR_COEF;
```

```
*I ITERATIONS;
MU_FULL = REPEAT(MU,1,&SIM_NUM);
SIGMA_FULL = I(&SIM_NUM) @ SIGMA ;

*GENERATE A MULTIVARIATE NORMAL DATASET;
OUTVALS1 = RANDNORMAL(&N,MU_FULL,SIGMA_FULL);

*RETURN ALL VALUES;
/*PRINT MU
SIGMA_SQ RHO SIGMA
MU_FULL SIGMA_FULL OUTVALS1 OUTVALS2 OUTVALS3;*/

*CREATE A DATASET TO OUTPUT;
CREATE OUTCOMES3 VAR {OUTCOME};
APPEND FROM OUTVALS3B;

QUIT;
RUN;
```

Bibliography

[1] Bretz, F., Koenig, F., Brannath, W., Glimm, E., and Posch, M.

[2] Cheng, B. and Chow, S.