Homework 1

For this homework assignment, please organize your HW by problem. A good approach is to “answer” each problem in prose and attach the work (hand computations, SPSS analyses, etc.)

Problem 1: The smell of virtue (no individual data, only summary statistics)

Liljenquist et al. (2010) published a paper (The smell of virtue: Clean scents promote reciprocity and charity) that included a study described as follows:

Experiment 1 tested the impact of clean scents on reciprocation of trust. Twenty-eight participants were individually assigned to either a clean-scented room or a baseline (regular-smelling) room. The only difference between these rooms was a spray of citrus-scented Windex in the clean-scented rooms.

In both conditions, participants engaged in a one-shot anonymous trust game involving two parties: a sender and a receiver. In a typical trust game, the sender is given money that he or she can either keep or “invest” with an anonymous receiver. Any money sent is tripled, and the receiver then decides how to split the tripled money. For example, if the sender invests all of the money and the receiver reciprocates this trust by returning half of the tripled amount, both parties would be better off. However, sending money can be risky if the receiver chooses to exploit the sender and keep all the invested money.

All participants in Experiment 1 were told that they had been randomly assigned to play the role of the receiver and that their ostensible counterpart had decided to send them the full amount ($4), which was tripled to $12. They had to decide how much money to return to the sender. Participants could exploit the sender by keeping all the money, or they could honor the trust by returning some portion to the sender. Below are the data from the experiment. Analyze the data as completely as you can (e.g., creating a source table for the ANOVA, estimate effect size, power, etc.) and interpret the results.

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<tr>
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<th>Baseline (Regular) Room</th>
<th>Clean-Scented Room</th>
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<tbody>
<tr>
<td>$M$</td>
<td>$2.81$</td>
<td>$5.33$</td>
</tr>
<tr>
<td>$s^2$</td>
<td>7.90</td>
<td>4.04</td>
</tr>
<tr>
<td>$n$</td>
<td>14</td>
<td>14</td>
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</table>

Assuming that you were planning to conduct this study, use G•Power (and assume a medium effect size), to estimate the number of participants one would need, if you wanted to achieve power of .80.

For the remaining problems:

1. Compute an ANOVA using SPSS.
2. Estimate the effect size ($\omega^2$) using formulas and calculator. Compare $\omega^2$ to the partial eta squared ($\eta^2$) produced by SPSS.
3. Estimate the power (1-β). [You need not use the computer, but you’re likely better off using G•Power or SPSS to estimate power.]
4. Test the homogeneity of variance assumption using (at least) the Levene test for homogeneity.
5. For each of the problems, compute a set of simple post hoc comparisons using the Tukey's HSD and Fisher-Hayter procedures. [You could try to compute one of these without a computer, just to be sure that you understand the logic.]
6. Now, for the most important part. Interpret the results of each study as completely as you can. What would you conclude about the results of each study (as in a Results/Discussion section)?
Problem 2: Superheroes (adapted from Field’s text and fabricated data set)

Data set is in HW1 folder as SuperheroMod.sav.

The fabricated data for this problem are loosely based on the findings reported by Davies, Surridge, Hole, and Munro-Davies (2007). [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2083410/]

Their abstract and discussion:

Abstract
Five cases of serious injuries to children wearing superhero costumes, involving extreme risk-taking behaviour, are presented here. Although children have always displayed behaviour seemingly unwise to the adult eye, the advent of superhero role models can give unrealistic expectations to the child, which may lead to serious injury.

The children we saw have all had to contemplate on their way to hospital that they do not in fact possess superpowers. The inbuilt injury protection which some costumes possess is also discussed.

Discussion
We are strong advocates of adventurous play and believe that risk taking is an inherent, important part of childhood. Imaginary role models are an essential part of growing up and it is important not to deny children their unrealistic dreams, whether it be scaling the sides of buildings, flying or playing football for England.

However, parents need to be aware that children may believe that their abilities have been given a super-boost with an appropriate costume. Parents whose children dress up as Bob the Builder should understand that hammers and saws are highly likely to be used in play. The parents of Spiderman aficionados should ensure that windows are correctly closed and locked. Superman's parents may find it easier to encourage their children to wear glasses, and Wonderwoman's parents may wish to give early fashion advice and not tell lies.

It is interesting to note the lack of injuries on the torsos of our two cases, where the children had worn anatomically correct costumes. We believe that the inherent padding of the imitation muscles may have spared them from significant further trauma. This is in contrast with other superhero costumes which do not have similar inbuilt protection.

There has been little research into the effect of superheroes on children. A paper published in the German journal Praxis der Kinderpsychologie und Kinderpsychiatrie compared the psychological effects of superhero comics and nursery rhymes. Although nursery rhymes have been shown to have increased levels of violence compared with pre-watershed television viewing, Hammon concluded that “superhero comics are dangerous for severely disturbed children, but fairy tales are certainly beneficial”.

The American National Association for the Education of Young Children ([http://www.naeyc.org]) produces a help sheet for parents called “When children imitate superheroes”. Helpful advice offered includes “Point out the difference between movies, TV, and real life”, and “talk about real heroes and heroines with children … like Helen Keller and Martin Luther King Jr”.

Keeping children safe is a very common theme in public health. From baby car seats to swimming pool fencing, legislation helps to prevent childhood morbidity and mortality. There is a huge array of safety adjuncts available in the open market, including a foam helmet aimed at minimising head injuries in normal toddlers learning to walk ([http://www.thudguard.com]). However, nothing can replace good parental supervision. There is evidence that wearing safety equipment can lead to increased injury owing to the risk compensation effect, where a safely equipped person takes more risk because of a lower perceived risk of injury.

We note that all our cases were boys and supermen or spidermen. Commercial role models for girls are less likely to show risk-taking behaviour; for instance, none of the authors have ever experienced any “My Little Pony”-related injuries. It is also striking that four of five cases were spidermen, a situation which is likely to change in the near future with the imminent release (at the time of writing) of a new Superman movie. Although the merchandising bombardment is yet to be released, we anticipate a rush of injured supermen to come through our department in the next few months.

Children have an extraordinary ability to injure themselves and will find new ways to do so in the future. Parents, however, should be aware that a superhero costume can provoke perceived super-abilities which need special supervision.

In addition to the typical analyses (see above), compute a restricted set of three comparisons that make sense to you (assuming that you did not know the results of the overall ANOVA). Evaluate the comparisons using both the Bonferroni and Sidák-Bonferroni procedures. Had these comparisons been planned, show how the analyses would have differed.

In addition, produce a graph showing the means and error bars (95% confidence intervals).
Problem 3: Taste and Morality (data fabricated based on reported results)

Data set is in HW1 folder as Eskine.sav.

Eskine, et al. (2011) published an article in Psychological Science with the intriguing title “A bad taste in the mouth: Gustatory disgust influences moral judgment.” Their abstract reads, in part…

Can sweet-tasting substances trigger kind, favorable judgments about other people? What about substances that are disgusting and bitter? Various studies have linked physical disgust to moral disgust, but despite the rich and sometimes striking findings these studies have yielded, no research has explored morality in conjunction with taste, which can vary greatly and may differentially affect cognition. The research reported here tested the effects of taste perception on moral judgments. After consuming a sweet beverage, a bitter beverage, or water, participants rated a variety of moral transgressions.

From their method section:

[Participants] were told that we were exploring the effects of motor interference (specifically arm-hand movements) on cognitive processing, and we therefore directed them to drink a beverage during a moral-judgment task to instantiate this movement in a natural way. Participants in the sweet condition were given Minute Maid Berry Punch, those in the bitter condition received Swedish Biters, and control participants were given water. They were not told the identity of the beverages, although an ingredient list was provided so they could check for potential allergens. Beverages were administered in two 1-teaspoon doses in a small cup; the first dose was given at the onset of the moral-judgment task, and the second one was administered at the halfway point to ensure that the taste lingered throughout the task. Participants were instructed to drink each dose in its entirety in a single swift motion, “as if you were drinking a shot.”

Moral judgments were assessed using Wheatley and Haidt’s (2005) moral vignettes, which portray various moral transgressions (second cousins engaging in consensual incest, a man eating his already-dead dog, a congressman accepting bribes, a lawyer prowling hospitals for victims, a person shoplifting, and a student stealing library books). All participants received the same six moral vignettes, in counterbalanced order. After each vignette, participants rated “how morally wrong” the offense was on a scale consisting of a 14-cm line representing a continuum from not at all morally wrong to extremely morally wrong. Participants were asked to make a slash at the point on the continuum corresponding to their impressions. These marks were then converted to scores ranging from 0 to 100, with higher scores indicating harsher moral judgments.

Using G•Power and assuming the typical effect size, estimate the number of participants one would need in a study such as this one, if one wanted to achieve power of .80.
**Problem 4:** Elevation and altruistic behavior

Data set is in HW1 folder as Schnall.sav.

Simone Schnall and her colleagues published a paper in *Psychological Science*:


From their abstract:
Feelings of elevation, elicited by witnessing another person perform a good deed, have been hypothesized to motivate a desire to help others. However, despite growing interest in the determinants of prosocial behavior, there is only limited evidence that elevation leads to increases in altruistic behavior...Feelings of elevation, but not feelings of amusement or happiness, predicted the amount of helping. Together, these results provide evidence that witnessing another person's altruistic behavior elicits elevation, a discrete emotion that, in turn, leads to tangible increases in altruism.

From their Procedure section:
Participants were informed that they were taking part in a 1-hr experiment on episodic memory in which they would watch a film clip, write about it, and complete a 30-min computer task. Tested individually, participants were randomly assigned to watch the elevation film clip from the Oprah Winfrey Show (elevation condition), the control film clip (the first 7 min of “The Open Ocean,” David Attenborough’s (1984) nature documentary describing a journey through the deepest part of the ocean), or a clip from a British comedy (“Fawlty Towers”) intended to induce mirth (mirth condition).

The experimenter then feigned three unsuccessful attempts to open the computer file that ostensibly needed to be completed by the participant. She then told the participant that, because it was impossible to complete the next part of the study, the participant was free to leave, but would still receive the full hour’s worth of course credit. Following the procedure outlined in Bartlett and DeSteno (2006), when the participant got up to leave, the experimenter asked, apparently as an afterthought, whether she would be willing to complete another questionnaire, ostensibly from another study for which the experimenter needed to establish norms. The experimenter noted that the questionnaire was, unfortunately, rather boring, emphasizing that the participant was under no obligation, and was free to stop whenever she wanted, but that completing any number of the items would greatly assist the experimenter. If the participant agreed to help, she was seated at a desk, reminded that she was free to stop whenever she wished, and given 85 elementary math problems. The participant’s work on the problems was secretly timed (the dependent variable in the experiment, time spent on the task). The participant was then probed for suspicions regarding the purpose of the study and debriefed.

In addition to the Levene test, assess homogeneity of variance using the Brown-Forsythe method. [Don’t even think about doing this without a computer, but actually compute the Brown-Forsythe analysis, not just the SPSS Brown-Forsythe adjustment.] Compare the Levene test to the Brown-Forsythe approach.
Problem 5: Guilt and pain.

Data set is in HW1 folder as Bastian.sav.

Bastian, et al. (2011) published an article in Psychological Science titled “Cleansing the soul by hurting the flesh: The guilt-reducing effect of pain.” It’s a brief article, so I’ll reproduce much of it below:

Pain purifies. History is replete with examples of ritualized or self-inflicted pain aimed at achieving purification (Glucklich, 2001). Some people feel that they can achieve reparation for their sins by simply experiencing pain; this may be why seeking self-punishment is a basic response to feelings of guilt (Freud, 1916/1957; Nelissen & Zeelenberg, 2009).

Why are pain and suffering believed to serve as atonement for sin? One reason may be that the experience of physical pain alleviates feelings of guilt associated with immoral behavior (Tangney, Stuewig, & Mashek, 2007). There has been very little research on the psychological benefits of experiencing pain. We tested two hypotheses relating to when and why people are likely to be motivated to experience pain—that people should be more motivated to subject themselves to a painful experience when they are reminded of their own immoral deeds, and that the experience of pain should reduce feelings of guilt.

Method

In return for $10, undergraduates participated in a study that they were told focused on mental acuity. They were allocated to one of three conditions. In the pain and no-pain conditions, participants wrote for 10 to 15 min about a time when they behaved unethically, that is, a time when they “rejected or socially excluded another person.” In the control condition, participants wrote about “an everyday interaction [they] had with another person yesterday.” All participants subsequently completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), which included an item assessing their experience of guilt.

Next, participants were informed that they would participate in a different study on physical acuity. Participants in the pain and control conditions were presented with an ice bucket (0° C–2° C) and were instructed by the experimenter to “immerse your nondominant hand, up to your wrist, into the bucket for as long as you can.” Participants in the no-pain condition were instructed to do the same with a bucket of warm water (36° C–38° C) for 90 s while also moving paper clips, one at a time, between two boxes. Specifically, they were instructed to “use your dominant hand to move as many paper clips from one box to another as you can.” The ice-bucket and warm-water tasks were designed to be equivalent in length, perceived purpose (i.e., testing physical acuity), required compliance (i.e., participants were asked to exert effort), and sense of achievement. When finished, participants again completed the PANAS (Watson et al., 1988).

Last, participants rated how much pain they experienced during the ice-bucket or warm-water task, using the Wong-Baker Pain Scale (Wong & Baker, 1988), which ranges from 0 (no hurt) to 5 (hurts worst). They also scored the morality of their actions in the recalled experience (three items: “I felt like what I did was very immoral,” “my actions were unethical,” “I was immoral”; α = .95) on a scale from 1 (not at all) to 7 (very much so).

First, tell me what’s going on in the last paragraph. In other words, what is the experimental function of the tasks reported in the last paragraph.

In addition to the Levene test, assess homogeneity of variance using the Brown-Forsythe method. [Don’t even think about doing this without a computer, but actually compute the Brown-Forsythe analysis, not just the SPSS Brown-Forsythe adjustment.] Compare the Levene test to the Brown-Forsythe approach.
Problem 6: Viagra and libido (fabricated data from Field)

Andy Field has created a data set that uses libido (measured in an unspecified fashion over the course of one week…we leave it to you to imagine how it might be measured in some integer [count] fashion) as the dependent variable and levels of Viagra (Zero [placebo], Low, and High) as the independent variable. Analyze the data by hand (with calculator) using the K&W bracket terms. You may also want to use SPSS as a way to check that you’ve conducted the ANOVA properly. Analyze the data completely, as per the rest of the instructions (2-6).

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<tr>
<th>Placebo</th>
<th>Low Dose</th>
<th>High Dose</th>
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Determine a set of orthogonal contrasts that would make sense with this study. Compute the $F$ ratio for each orthogonal comparison. Add together the $SS_{Comparison}$ for each contrast to determine that the sum is equal to the $SS_{Treatment}$ for the overall ANOVA.