**After**consulting the answer sheet and carefully looking over your answer, if you have a disagreement or do not understand your grade, make an appointment with the person who graded the question as indicated on the answer sheet.  You will need to make a careful argument why a grade should be changed rather than ask the grader to justify the grade.  Please keep in mind that the total point total for the class is 600 points.

**M = 81.09, SD = 11.29**

1. Heather Bazille ([hb456@cornell.edu](mailto:hb456@cornell.edu)) graded question 1.

This question is bolded, so it needs to be original.

a. **1 point**

either a drawing or picture of a sign brought to the exam attached to the blue book or a drawing of a sign in the blue book.

b. **3 points per characteristic**

Examples of characteristics (Note: only one characteristic per bullet point can be used):

* East/West etc. assumes you know where you are
* Destination point is unknown or ambiguous.
* Symbols used are not universal or widely understood.
* Visibility - insufficient size of lettering, not enough contrast between lettering and background, not placed at a prominent place where you can readily see it
* Placement - not located at proper place where decision is being made
* Movement - if viewing a sign while moving, it is not placed in order to provide sufficient time to make decision
* Egocentrism - sign is ignoring need for egocentric orientation (position of body in space matches orientation of sign), “you are here” only you are not “here”
* Lacks sequencing of multiple signage placed in a hierarchical manner (trip planning) that matches the decisions as you use the space (e.g. Madrid subway system places signage in relation to decisions made as you use the system: which line; which endpoints; which hallway/stairs/escalator to reach correct line; etc.)

c. **3 points**

Change or add opposite of one of the characteristics listed above. (Note: cannot be one included in the answer for part b).

d. **2 points per proposed change and 4 points per evidence from lecture or readings**

Note: Change cannot include signage.

Examples of changes:

* Make floorplan or pattern of place a simple geometric shape or structure
* If multiple floors or levels, alignment between different segments
* Differentiation (e.g. color, texture, materials) to cut down on homogeneous background
* Visual prospect of major landmarks or destinations from decision points
* If interior, ability to see outside
* Making Lynch cognitive map elements (landmark, path, district, edge, node) more legible.

Note: Not sufficient to just say “provide a landmark” or another element. Need to describe specific characteristic of the element that makes it more legible (e.g. relatively tall or distinctive landmark; path system that is a grid; district with clear boundaries; edge that aligns with natural boundary; node that has a landmark on it).

2. Gary Evans ([gwe1@cornell.edu](mailto:gwe1@cornell.edu)) graded question 2.

A.

**2** for the basic graph. We accepted the above graph or one showing a U as long as the left hand part of the U was showing cold temperatures.

B. These effects would be stronger for males and in high humidity. Another person variable might be an elderly worker or someone with a disability that affected co-ordination or visual perception. Another environmental factor that would affect the link between temperature and accidents is humidity. Higher humidity would elevate the adverse impacts of high temperature. Another environmental factor that would exacerbate the harmful impacts of temperature could be poor lighting conditions. **2** for each, thus total of **4**

b. Environmental justice refers to the fact that SES, minority status and other sociodemographic factors often are associated with exposure to lower quality environmental conditions. In this example workers probably have lower environmental quality where they work relative to management. **3**

Risks and hazards workers relative to managers likely are exposed to riskier, more hazardous conditions such as moving objects, chemical/high temperatures that cause burns, may be required to move and thus might have more falls, entanglements with moving parts of machinery   
Temperature workers are more likely to be in hotter temperatures than managers  
Behavioral toxicology workers likely exposed to more toxins, poorer quality air than managers  
Anthropometrics/biomechanics workers relative to managers likely experience more biomechanical problems such as repetitive strain because they tend to have less variety in what they do and do more manual work. Some of this manual work may strain anthropometric capacities. **3** each, total of **6**

c. To improve worker’s performance, I would increase the brightness of lighting since this will improve acuity and visibility. Several studies show that performance, especially on tasks requiring high levels of acuity (small detailed task) increases with more illumination. The effects are nonlinear, however, and at a certain point the benefits asymptote. The addition of more natural light to the work area might have beneficial effects on mental health as well as cause a reduction in stress hormones such as cortisol. Students exposed to natural light have more normal circadian rhythms for cortisol in comparison to students in classrooms with no natural light. In months of the year when there is more natural light, people living away from the equator have less depression. **2** for performance impact and **2** for health impact.

d. I would compare performance on challenging, open ended problems in a blue vs. a red room. I would expect to see a benefit of blue on this type of open ended, creative problem. Several studies have found that tasks such as analogies, creativity tests, or indices of innovation (e.g. making a toy from a set of parts) are enhanced by blue light.

An alternative might be to compare red and blue but demonstrating superior performance under red for tasks that demands focused attention, precision, or detail. The toy test experiment found that when the parts were red, the solution was more practical than when the parts were blue. Proofreading was enhanced in another study by red. **3** for description of the experiment/methodology **3** for evidence. Note: for both parts c. and d. a common problem was very general descriptions:

“people exposed to natural light are less depressed [happier]”

“research showed that red facilitates performance on tasks requiring high accuracy or detailed focus” Needed to have more detailed description of the study or the measures that were used.   
  
3. Tuvshinzaya Amarzaya ([ta357@cornell.edu](mailto:ta357@cornell.edu)) graded question 3.

Total 25 points = a(4) + b(6) + c(6) + d(9)

1. (4pt) = 1pt for correct description of graph + 3 pts for explanation

(1pt) This graph indicates that over historical time the amount of energy needed to produce one calorie of food is increasing.

(3pts) This is important for environmental problems for several reasons. First, it indicates that the efficiency of technological innovations to produce food are dropping. Second, the trend suggests that eventually we will no longer be able to produce enough food because of the energy demands. Third, since most forms of energy produce adverse environmental impacts such as pollution, the increasing demand for energy use to provide food is likely to damage environmental quality. [Parallel argument could be made for global climate change since most energy production produces carbon dioxide and other gases that elevate global temperature.]

1. (6pt) = 3pts for tying Malthus’ original proposition to graph + 3 pts for explaining how critiques of Malthus relates to graph

(3pts) This graph is consistent with Malthus’ concern that population growth will inevitably lead to serious problems such as famine, war, or disease. He argued that when population growth reaches carrying capacity, resources will no longer be insufficient to support a population. To put it differently, there are limits to growth and at some point resources cannot sustain the population.

(3pts) In terms of critiques of Malthus, when growth in surplus of various resources does not continue to expand at the same rate with population growth (point of diminishing returns), this signal is responded to by coming up with solutions to continue to allow for surplus to grow at the same rate. Typically these solutions involve technology (technological fix). This graph challenges the efficacy of technological solutions because it suggests no matter what kind of technological solutions we create, eventually we are simply going to run out of energy. This graph refutes the critique of Malthus that he ignored human ingenuity/creativity to think our way out of the dilemma of carrying capacity.

Tuvshinzaya If you want to remove above that is fine but then you should remove the carrying capacity diagram below:

1. (6pts) = 3pts for Dominant Social paradigm + 3 pts for New Ecological paradigm

(3pts) Dominant Social Paradigm: Their response would reflect a belief in technology indicating that eventually we will figure out a way to continue to provide necessary resources to support the earth’s population through invention/human ingenuity. (if belief in technology is missing= -2pts, belief that the earth is resource for humankind to consume is anthropocentrism, which is part of DSP)(3pts) New Ecological Paradigm: They would suggest that the graph illustrates the limitations of relying on technology and other means to overcome population growth. Eventually there are limits to growth and in this case, there is a limit to how much energy we can produce. Another tact to take would be to note that this inefficiency likely expands the carbon footprint because of decrease in energy efficiency will thus require more energy. This likely leads to more carbon dioxide emissions and thus accelerates global climate change.

1. (9pts)= 3pts for Environmental Attitude + 3pts Effective info + 3pts Intention=>Behavior

**Note d. is bold so must be an original answer.**

The 3 approaches could be for 3 different environmental issues (1 for water conservation, 1 for recycling, 1 for fossil-fuel reduction OR 1 for water conservation and 2 for recycling) or for 3 approaches for 1 problems (water conservation through 1. Changing attitude toward grey-water reuse 2. Providing scientific info about water scarcity 3. Designing auto spigots to conserve water)

But! If there is double-dipping (using same program for 2 categories: e.g. educating public with scientific facts about water scarcity for both 1. Change attitude and 2. Effective info), we took -2 pts off from the second category.

The behavior needs to be tied to environmental problems. Something about population size or growth or something around energy use, carbon footprint, consumption.

The answer needs to come up with one factor each for influencing environmental attitudes; information that is more effective in changing ecological behavior; and then converting behavioral intentions to actual behavior. Each of these three answers needs to be grounded in lecture or readings.

Affecting environmental attitudes (3pts: only 1 is needed of those below)

(3pts)= 1pt (description) + 1(justification) + 1(backing up with research from class/readings)

* active involvement with nature such as hands on environmental education
* spending time actively engaged with nature
* increase levels of education
* provide scientific education
* framing information in a manner consistent with political ideology (e.g. conservative will respond more positively to appeals to the purity of nature or relating to patriotism includes taking good care of our land, water, air)

More effective information(3pts: only 1 is needed of those below)

(3pts)= 1pt (description) + 1(justification) + 1(backing up with research from class/readings)

* Feedback about use/consequences of ecological behaviors
* Providing prompts that are clear and immediate at time decisions are made about ecological behaviors
* Using more credible sources of information
* Appealing to norms indications that others are behaving in the more ecological manner
* Knowledge about implementation make it clear how to enact the desired behavior, information on what you need to do and how or where to engage

Converting from behavioral intention to behavior (3pts: only 1 is needed of those below)

(3pts)= 1pt (description) + 1(justification) + 1(backing up with research from class/readings)

* Reduce the difficulty of engaging in the behavior. Behaviors that are easy are highly correlated with attitude.
* Empower individuals with the ability to enact the behavior. Remove barriers to make the behavior more under individual control/choice. Also increasing general sense of self efficacy or mastery.
* Reduce general feelings of helplessness; lack of mastery.
* Utilizing social traps (Skinnerian) principles add a counter reinforcer of change the delay of a future reinforcer to reinforce the desired behavior

**4. JeeEun Lee (**[**jl3738@cornell.edu**](mailto:jl3738@cornell.edu)**) graded question 4.**

1. **[ 5 points = naming ‘Biophilia’ correctly (1 pt) + explanation of Biophilia (1 pt; should include ‘evolve’ or ‘inherent’) + naming ‘Attention restoration theory (1 pt) + explanation of the relation of voluntary attention and restoration (1 pt) + mentioning restorative characteristics of nature (1 pt) ]**

**\*\*\* just mentioning there are voluntary and involuntary attentions without explaining why they are related to restoration doesn’t earn point.**

Biophilia theory argues that natural environments are restorative because they more closely resemble the kinds of environments the human species evolved in. Experiences in nature are inherently positive.

Attention restoration theory suggests that natural environments are restorative because they often, but not necessarily, encompass several characteristics that support restoration. Voluntary attention requires effort (“pay attention”) and people have a finite capacity of voluntary attention. Restoration occurs when this capacity is replenished by certain characteristics including: fascination or elements that attract our attention/ curiosity without effort. Coherence-underlying pattern or structure. Being away or a change from our normal routine. Contemplation and reflection – minimum of distraction, space and time to reflect, to plan.

b. **[ 4 points = correctly stating ‘Biophilia’ (2 pt) + interpretation of the graph and explanation (2 pt) ]**

The first figure supports the biophilia hypothesis since the sounds that were aversive were all human made and the sounds that were not aversive were all natural sounds. We don’t know anything in detail about any other qualities of these sounds related to Attention Restoration elements.

c. **[ 5 points = correctly stating ‘less conclusive’ (2 pt) + explaining both panda and waterfall videos are from nature (2 pt) + additional explanation (1 pt; e.g. attention restoration theory may explain this graph better) ]**

These data are less conclusive in supporting biophilia for two reasons. First both are natural but the panda video is more restorative. Biophilia says nature per se is restorative. Second, the panda video likely is more interesting/fascinating than the waterfall. Thus it may be more restorative because of this major element of attention restoration theory.

d. **[ 4 points = 2 points for each measures ]**

Self reports (questionnaire/interview) of less stress  
 Reduction in biomarkers of stress such as cortisol or blood pressure  
 Better task performance on tasks that require focused attention or concentration; inhibition of dominant response like Stroop or flanker task.   
 Faster recovery from illness.  
 Less absenteeism, illness in a highly stressful job or other chronic situation

e. **[ 7 points = correctly stating ‘Attention Restoration theory’ (2 pt) + mentioning involuntary or effortless attention correctly (1 pt) + comparing two conditions with/without Stroop test (cognitive fatigue induced) (2 pt) + comparing two videos (2 pt; panda video is more interesting and restorative than waterfall) ]**

These data are stronger in support of Attention Restoration theory because the basic principle of this theory is that when voluntary attention or effortful attention is used this depletes the individual capacity for this type of attention. Restoration happens when involuntary or effortless attention is used. This restores capacity for effortful attention. The Stroop task requires focused attention and the inhibition of a dominant response which would produce cognitive fatigue. When cognitive fatigue is produced, the more fascinating/interesting video (pandas) provides greater recovery than the less fascinating (waterfall) video.