Independent variables in research pdf

Variables in the study are characteristics that can take different values, such as height, age, species, or test scores. In scientific studies, we would often like to study the effects of one variable on another one. For example, you can test whether students who spend more time studying can get better test scores. The variables in the study for cause and effect relationships are called independent and dependent variables. An independent variable is the cause. Its value is independent of other variables in the study. Dependent variables are effects. The value depends on the change in the independent variable. Independent and dependent variable research question Examples of independent variables(s) Dependent variables(s) Do tomatoes grow fastest under fluorescence, incandescent, or natural light? What kind of light of tomato plant is growing at the growth rate of tomato plants is the effect of diet and regular soda on blood sugar levels? What kind of soda do you drink (diet or regular) and how does phone use before bedtime affect your sleep? How well can different plant species tolerate brine, the amount of phone use before bed time of the time of sleep of the time of sleep? The amount of salt added to the water quality plant growth plants of plants in the experimental study plant survival rate independent and dependent variables in the test study, independent variables are manipulated or changed to measure the effect of this change on the dependent variables. Experimental examplesYe have been studying the effects of new drugs on blood pressure in hypertensive patients. To test whether the drug is effective, divide the patient into two groups. One group took the drug, while the other group took a sugar drug placebo. Independent variables are different treatments for different groups: the type of pills the patient receives. Your flotation variable is the result you measure: the patient's blood pressure. Independent variables are typically applied at different levels to see how the results are different. Two levels can be applied to ensure that independent variables work at all, such as new drugs and placebos. You can also apply different levels (for example, three different doses of a new drug) to see how independent variables affect flotation variables. Variables in other types of studies outside the experimental environment often cannot directly manipulate or change the independent variables of interest. Instead, you should look for existing examples of independent variables and investigate how changes to these variables affect dependent variables. Research YesYe you are interested in whether the high minimum wage affects employment rates. You don't have direct control over the minimum wage. Instead, look at the states that raised the minimum wage last year, comparing them to their neighbors who didn't. The variable is the minimum wage. Dependent variables are employment rates. By comparing the differences in outcomes between the two states (and taking into account other factors), you can investigate whether changes in the minimum wage have affected employment rates. In non-experimental studies, it is more difficult to establish a clear cause-and-effect relationship, because other variables that have not been measured can affect changes. This is called a confusion variable. For research types where the exact relationship between variables is less obvious, you can use different terms for independent and dependent variables. Other names for independent variables Sometimes variables that you think are the cause may not be completely independent - they may be affected by other variables. In this case, one of these terms is more appropriate: a description variable (which describes an event or result) a predictor (which can be used to predict the value of a dependent variable) and a right-side variable (which appears to the right of the regression equation). Other names for dependent variable dependent variables are also known in the following terms: response variables (which respond to changes in other variables) result variables (which indicate the results you want to measure) left-side variables (shown to the left of regression equations) Scribbr editors not only correct grammar and spelling mistakes, but also enhance writing by checking for paper-free. Awkward idiom, with overlapping words. The editing example refers to independent and dependent variable visualizations, where researchers often use charts or graphs to visualize the findings. The norm is to place variables independent of y or vertical axes on x or horizontal axes and dependent variables. For example, what might a graph look like in an example study of the effects of a new drug on blood pressure? FREQUENTLY ASKED QUESTIONS WHAT ARE THE INDEPENDENT AND DEPENDENT VARIABLES? In terms of cause and effect, you can think of independent variables and dependent variables: independent variables are variables that you think are the cause, and dependent variables are effects. Manipulate independent variables in your experiment and measure the results of dependent variables. For example, in experiments on the effects of nutrients on crop growth: an independent variable is the amount of additional nutrients in the crop field. The dependent variable is the biomass of the crop at harvest time. Defining variables and determining how variables are manipulated and measured is an important part of experimental design. Why researchers often explain that their research involves several independent variables. Define a coefficient design and use the Coefficient Design table to represent and interpret a simple coefficient design. Distinguish interactions with key effects and recognize and provide examples of each. Interpret histograms and line graphs that show your findings with a simple counting design. Just as it is common for studies in psychology to contain multiple dependent variables, it is also common to include multiple independent variables. Schnall and her colleagues studied the effects of disgust and personal physical consciousness from the same study. The researchers, who include several independent variables in one experiment, are further explained by the following real-world titles in various professional journals: The effect of time delay and direction on haptic object recognition open-mind: coping with the need for closure and pain-inducing intentions to the combined effects of cross-group contact and bias effects of expectations, as if it included multiple dependent variables on the same experiments as the effects on age and spontaneous perception and the effects of reduced food and reduced food size and reduced awareness. For unconss bound iterations, more research questions can be answered, so multiple independent variables are also included in the same experiment. For example, instead of conducting one study on the effects of aversion to moral judgment and one study of the effects of personal body consciousness on moral judgment, Schnall and colleagues were able to conduct one study that addressed both questions. However, including multiple independent variables, researchers can answer the question of whether the effectiveness of one independent variable depends on the level of the other. This is called the interaction between independent variables. For example, Schnall and her colleagues observed an interaction between disgust and personal body consciousness because the effect of disgust depends on whether participants are high or low in their personal body consciousness. As we will see, interactions are often among the most interesting results in psychological research. Each level of one independent variable (also known as an element) is combined with each level of the other variable to create all possible combinations. Each combination is a condition in the experiment. For example, imagine experimenting with the effects of cell phone use (yes vs. no) and day time (day and night) on driving ability. This is shown in Figure 8.1. The columns in the table indicate mobile phone usage, and the rows represent the time of day. The four cells in the table indicate four possible combinations or conditions: using a mobile phone during the day, not using a mobile phone during the day, not using a mobile phone at night, and not using a mobile phone at night. This particular design is referred × 2 (read 2) in two different levels, because it combines two variables, each with two levels. If you are one of the independents The third level (e.g. using a handheld phone to use a hands-free phone and not using a mobile phone) will be a 3×2-note design and there will be six conditions. The number of possible conditions is the product of the number of levels. 2 × 2-2-man design has 4 conditions, 3×2-2-man design has 6 conditions, and 4×5-5-man design has 20 conditions. The Figure 8.1 coefficient design table shows the 2× 2 coefficient design in principle, and the coefficient design can contain independent variables with levels. For example, experiments may include the type of psychotherapy (cognitive versus behavioral), the length of psychotherapy (2 weeks to 2 months), and the gender of the psychotherapist (female to male). This will × 2 × 2 factor designs and there will be 8 conditions. Figure 8.2 shows one way to represent this design. In fact, it is unusual to have three or more independent variables, each with two or three or more levels. This is for at least two reasons: in one case, the number of conditions can quickly become uncontrollable. For example, if you add a fourth independent variable in the current example with three levels (for example, low to medium versus high), it becomes a 2× ×2 × 2×3-person design with 24 distinct conditions. Second, the number of participants required to meet all these conditions (while maintaining reasonable ability to detect actual underlying effects) can make the design un realizable (see discussion of the importance of proper statistical power in Chapter 13 for more information). Therefore, the rest of this section focuses on designs with two independent variables. The general principles discussed here simply extend to more complex element designs. The Figure 8.2 Coefficient Design table represents a 2×2 × 2-factor design, and in a simple inter-topic design that assigns participants to conditions, each participant is tested under only one condition. In a simple my subject design, each participant is tested under all conditions. In a factor experiment, you should decide to take a subject or my subject approach for each independent variable. In a cross-subject coefficient design, all independent variables are manipulated between subjects. For example, all participants may test during or during the day or at night when they are using or not using their mobile phone. This means that only one participant has been tested under one condition. In the in-subject coefficient design, all independent variables are manipulated within the subject. All participants can test both while using the phone and not using it both during the day and at night. This means that each participant has been tested. The advantages and disadvantages of these two approaches are the same as discussed in Chapter 6. The design between subjects is conceptually simple, prevents back-to-back effects, and minimizes the time and effort of each participant. The inner design of the subject is more efficient for researchers and controls external participant variables. You can also manipulate the subject and one independent variable within the subject. This is a . For example, researchers may choose to treat cell phone use as a factor in subjects while using a mobile phone (while balancing the sequence of these two conditions). However, he or she can choose to test each participant during the day or night to treat the time of day as a factor between topics (perhaps because this only needs to come in for one test). Therefore, each participant in this mixed design is tested under two of the four conditions. Whether the design is between subjects, subjects, or mixes, the actual assignment of a participant's conditions or order of conditions is usually performed randomly. Un manipulated independent variables One of the independent variables in many element designs is an uno manipulator independent variable. Researchers measure it but don't manipulate it. The work of Schnell and his colleagues is a good example. One independent variable is disgust, researchers manipulated by testing participants in clean rooms or messy rooms. The other is personal body consciousness, which researchers simply measured in participant variables. Another example is a study exposed to a few words that Ree Brown and his colleagues were asked to remember later (Brown, Coslin, Delama, Perm, Barsky, 1999). The manipulated independent variable was a type of word. Some are negative health-related words (e.g., tumors, coronary arteries), and others are not health-related (e.g., elections, geography). The non-authored independent variable is whether the participants were high or low in hypochondriasis (excessive concern for general physical symptoms). The result of this study was that high participants in hypochondriasis were better than those low in hypochondriasis at remembering health-related words, but they were no better at remembering non-health-related words. These studies are very common and there are some points worth making about them. First, non-authored independent variables are typically participant variables (personal body consciousness, hypochondriasis, self-esteem, etc.), and are therefore elements by definition between subjects. For example, people are low in hypochondriasis or high in hypochondriasis; They cannot be tested under these two conditions. Second, such studies are generally considered experiments with at least one independent variable. It is manipulated regardless of the number of independent variables that have not been manipulated. Third, it is important to remember that you can only point to a relationship with an independent variable that is manipulated. For example, Schnall and her colleagues were justified in concluding that disgust influenced the harshness of participants' moral judgments. However, they would not have been justified in concluding that the participants' personal body consciousness affected the harshness of the participants' moral judgments because they did not manipulate those variables. For example, having a strict moral code and a high awareness of the body can all be caused by a few third variables (such as neurosis). Therefore, it is important to recognize which variables are manipulated in the study and which are not. Graph the results of a factor experiment The results of a factor experiment with two independent variables can be graphed by representing one independent variable on the x axis and another variable using a different kind of bar or line. The y-axis is always reserved for dependent variables. Figure 8.3 shows the results for two virtual coefficient experiments. The top panel shows × 2 designs in 2 hours. The time of day (day and night) is displayed at different locations on the x axis, and the use of the phone (no example) is displayed as a bar of different colors. (You can also indicate your phone's use on the x axis and at times of the day as bars in different colors; the choice comes down to how it seems to convey the results most clearly.) The bottom panel in 8.3 shows the results of one quantitative 4× 2 design of variables. This variable, psychotherapy length is expressed along the x axis, and other variables (psychotherapy type) are expressed in differently formatted lines. A line graph, not a histogram, because the variables on the x-axis are quantitative to a small number of unique levels. Line graphs are also suitable for representing measurements made through time intervals (also known as time series information) on the x-axis. Figure 8.3 There are two kinds of results: the main effect and the interaction effect (also known as interaction), the two methods of plot the results of the factory experiment with the interaction of the two independent variable key effects and the factorial design. A is the statistical relationship between one independent variable and a dependent variable, averaging at the level of the other independent variable. Therefore, there is one major effect to consider for each independent variable in the study. The top panel in Figure 8.3 shows the main effects of mobile phone use, as participants had better driving performance on average when they were not using their phones than before. The blue bar Higher than the red bar. It also shows the main effects of the day because participants had better driving performance during the day than during the day, both when they were using their phones and when they were not. The main effect is that the meaning for whether there is a major effect of one independent variable is independent of each other and says nothing about whether the other is the main effect. The bottom panel in Figure 8.3 shows, for example, the clear main effect of psychotherapy length. The longer the psychotherapy, the better it worked. If the effect of one independent variable depends on the level of the other variable, there is an effect (or interaction). It may seem complicated, but you already have an intuitive understanding of the interaction. For example, it's not surprising to hear that the effects of psychotherapy are stronger among those who motivate change than those who don't have a change. This is an interaction because the effectiveness of one independent variable (whether or not you receive psychotherapy) depends on the level of the other (motivation for change). Schnall and her colleagues also showed interaction with the participants' moral judgments because the effect of whether the room was clean or messy depended on whether the participants were low or high in private body consciousness. If they are high on personal body consciousness, the people in the messy room made harsh judgments. If they were low on personal body consciousness, then it didn't matter whether the room was clean or messy. The effectiveness of one independent variable can vary depending on the level of the other variable in several ways. This is shown in Figure 8.4. In the top panel, independent variable B affects level 1 of independent variable A, but not at level 2 of independent variable A. (This is similar to the research of Schnal and her colleagues, which had the effect of disgust on those high in private body consciousness, but also in those with lower personal body consciousness.) In the intermediate panel, independent variable B has a stronger effect at level 1 of independent variable A than level 2. This is like a hypothetical driving example that had a stronger effect of using your phone at night than during the day. In the bottom panel, independent variable B again affects two levels of independent variable A, but the effect is in the opposite direction. Figure 8.4 represents the most powerful form of this kind of interaction, called crossover interaction. One example of crossover interaction comes from a study by Kathy Gilland on the effects of caffeine on introverts and extrovert oral test scores (Gilliland, 1980). Introversion performs better than extroversion when caffeine is not consumed. But extroverts perform better than introverts when ingested 4 mg of caffeine per kilogram of body weight. Figure 8.4 Display Bar Graph The type of interaction. In the top panel, one independent variable affects one level of the second independent variable, but the other variable does not. In the intermediate panel, one independent variable has a stronger effect at one level of the second independent variable than the other. In the lower panel, one independent variable has the opposite effect at one level of the second independent variable than the other. Figure 8.5 shows an example of this kind of interaction when one of the independent variables is quantitative and the results are plotted in a line graph. In a crossover interaction, the two lines literally intersect each other. Figure 8.5 Is a line graph showing three types of interactions. In the top panel, one independent variable affects one level of the second independent variable, but the other variable does not. In the intermediate panel, one independent variable has a stronger effect at one level of the second independent variable than the other. In the lower panel, one independent variable has the opposite effect at one level of the second independent variable than the other. The findings by Brown and her colleagues were inspired by the idea that people with hypochondriasis are particularly

careful with any negative health-related information. This led to the hypothesis that high people in hypochondriasis would remember negative health-related words more accurately than low people in hypochondriasis but they remember non-health-related words about the same as low people in hypochondriasis. And, of course, this is exactly what happened in this study. Researchers often include multiple independent variables in their experiments. The most common method is a coefficient design in which each level of one independent variable is combined with each level of another variable to create all possible conditions. In factory design, the main effect of an independent variable is the overall effect that is averaged in all other independent variables. Each independent variable has one main effect. There is an interaction between two independent variables when one effect depends on the level of the other variable. Some of the most interesting research questions and findings in psychology are specifically about interactions. Walkthring: Return to the five article titles presented at the beginning of this section. Identify independent and dependent variables for each. Walkthring: Create a factory design table for experimenting with room temperature and noise level impact on mcat's performance. Show whether each independent variable will be manipulated between topics or between subjects, and explain why. Exercises: Sketch 8 different histograms depict each possible outcome in a 2 x 2 factor experiment: there is no main effect of A; There is no main effect of B; A interaction no major effect; No mains B; The main effect of no interaction A; The main effects of B; A interaction no major effect; The main effects of B; A interaction no major effect; The main effects of B; The main effects of interaction A; There is no main effect of B; No major effect of interaction A; The main effects of B; No major effect of interaction A; There is no main effect of B; Interaction Image Description Figure 8.5 Image Description: Three panels, each showing a different line graph pattern. In the top panel, one line remains constant, while the other line rises up. In the middle panel, two lines go up, but at different speeds. In the bottom panel, one line goes down and the other line rises up and intersects. Return to Figure 8.5 Is an approach that involves multiple independent variables in an experiment where each level of one independent variable is combined with each level of another variable to produce all possible combinations. A table showing each condition created by a combination of variables. All independent variables are manipulated between subjects. When one independent variable is manipulated between the subject and another variable, it is manipulated within the subject. In factor design, researchers measure independent variables, but do not manipulate them. Statistical relationship between one independent variable and dependent variable in a factory design - average at the level of another independent variable. The effect of one independent variable depends on the level of the other variable. Anything else.