Chapter 3: Introduction to Quantitative Research
Test Bank

MULTIPLE CHOICE

1. A researcher conducts a study to determine the effectiveness of a special program of sensitivity training for nurse managers upon several outcomes, all related to the staff's ability to identify and intervene appropriately when medication errors occur. This is an example of what type of quantitative research?
   a. Applied research
   b. Basic research
   c. Descriptive research
   d. Qualitative research

   ANS: A
   Applied, or practical, research is a scientific investigation conducted to generate knowledge that will directly influence or improve clinical practice. The purpose of applied research is to solve problems, to make decisions, or to predict or control outcomes. Basic, or pure, research is a scientific investigation that involves the "pursuit of knowledge for knowledge's sake," or for the pleasure of learning and finding truth. The purpose of basic research is to generate and refine theory and build constructs; thus, the findings are frequently not directly useful in practice. However, because the findings are more theoretical in nature, they can be generalized to various settings. Descriptive quantitative research and qualitative research describe what exists but do not test specific interventions used in practice.

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2. A researcher randomly assigns a large group of subjects who are hospital patients either to receive magnesium at bedtime or not to receive magnesium at bedtime, and then measures sleep quality and duration. What type of research is this?
   a. Correlational research
   b. Experimental research
   c. Descriptive research
   d. Quasi-experimental research

   ANS: B
   Control occurs when the researcher imposes "rules" to decrease the possibility of error and thus increases the probability that the study's findings are an accurate reflection of reality. Descriptive and correlational studies are usually conducted with minimal control of the study design, because subjects are examined as they exist. In experimental research, the independent and dependent variables are highly controlled, the researcher exerts high control over the planning and implementation of the study, and often these studies are conducted in a laboratory setting on animals or objects. If a research study randomly assigns subjects to two different groups, applies an intervention to one of the groups, and then measures both groups and compares them, it is experimental design.

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Use the following information to answer Questions 3 through 7:

A research study contains the following in its Introduction section: "This study was undertaken to explore the effect of massage on total hours of sleep per 24-hour day, in persons averaging fewer than 7 hours of sleep per night, attributable to insomnia. . . . Presumably by increasing endorphin levels, massage seems to provide an immediate relaxation and an ability to sleep immediately following the session, but it is unclear whether these benefits actually extend to total sleep, despite anecdotal support. The claim that massage increases total hours of sleep has been inadequately researched. . . . Does massage increase the total number of hours of daily sleep? . . . It was posited that provision of daily late-morning massage would affect total hours of sleep per 24-hour day. The study's causational explanation was based on the physiologic matrix of McCarthy, which includes effects of endorphins on sleep, learning ability, pain, digestive function, and cardiac output. . . . It was taken as established fact that massage is pleasant, that research subjects getting fewer than 7 hours of sleep per night were sleep-deprived, and that endorphins mediated the changes observed."

3. What is the research problem?
   a. This study was undertaken to explore the effect of massage on total hours of sleep per 24-hour day, in persons averaging fewer than 7 hours of sleep per night, attributable to insomnia.
   b. It was posited that provision of daily late-morning massage would affect total hours of sleep per 24-hour day.
   c. It was taken as established fact that massage is pleasant, that research subjects getting fewer than 7 hours of sleep per night were sleep-deprived, and that endorphins mediated the changes observed.
   d. Presumably by increasing endorphin levels, massage seems to provide an immediate relaxation and an ability to sleep immediately following the session, but it is unclear whether these benefits actually extend to total sleep, despite anecdotal support.

   ANS: D
   A research problem is an area of concern or phenomenon of interest about which there is a gap in the knowledge base needed for nursing practice. The problem identifies an area of concern or phenomenon of interest for a particular population and often indicates the concepts to be studied.

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4. What is the research framework?
   a. It was taken as established fact that massage is pleasant, that research subjects getting fewer than 7 hours of sleep per night were sleep-deprived, and that endorphins mediated the changes observed.
   b. Presumably by increasing endorphin levels, massage seems to provide an immediate relaxation and an ability to sleep immediately following the session, but it is unclear whether these benefits actually extend to total sleep, despite anecdotal support.
   c. It was posited that provision of daily late-morning massage would affect total hours of sleep per 24-hour day.
   d. The study's causational explanation was based on the physiologic matrix of McCarthy, which includes effects of endorphins on sleep, learning ability, pain, digestive function, and cardiac output.

ANS: D
A framework is the abstract, logical structure of meaning that will guide the development of a study and enable the researcher to link the findings to the body of nursing knowledge. In quantitative research, the framework is often a testable midrange theory that has been developed in nursing or in another discipline, such as psychology, physiology, or sociology.

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5. What is the research assumption?
   a. This study was undertaken to explore the effect of massage on total hours of sleep per 24-hour day, in persons averaging fewer than 7 hours of sleep per night, attributable to insomnia.
   b. It was posited that provision of daily late-morning massage would affect total hours of sleep per 24-hour day.
   c. It was taken as established fact that massage is pleasant, that research subjects getting fewer than 7 hours of sleep per night were sleep-deprived, and that endorphins mediated the changes observed.
   d. Presumably by increasing endorphin levels, massage seems to provide an immediate relaxation and an ability to sleep immediately following the session, but it is unclear whether these benefits actually extend to total sleep, despite anecdotal support. The claim that massage increases total hours of sleep has been inadequately researched.

ANS: C
Assumptions are statements that are taken for granted or that are considered true, even though they have not been scientifically tested. Assumptions are often embedded (unrecognized) in thinking and behavior, and uncovering them requires introspection. Sources of assumptions include universally accepted truths, theories, previous research, and nursing practice.

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6. What is the research purpose?
   a. This study was undertaken to explore the effect of massage on total hours of sleep per 24-hour day, in persons averaging fewer than 7 hours of sleep per night, attributable to insomnia.
   b. It was posited that provision of daily late-morning massage would affect total hours of sleep per 24-hour day.
   c. Presumably by increasing endorphin levels, massage seems to provide an immediate relaxation and an ability to sleep immediately following the session, but it is unclear whether these benefits actually extend to total sleep, despite anecdotal support. The claim that massage increases total hours of sleep has been inadequately researched.
   d. The study's causational explanation was based on the physiologic matrix of McCarthy, which includes effects of endorphins on sleep, learning ability, pain, digestive function, and cardiac output.

ANS: A

The research purpose is generated from the problem and identifies the specific focus or aim of the study. The focus of the study might be to identify, describe, explain, or predict a solution to a situation. The purpose often indicates the type of study to be conducted (descriptive, correlational, quasi-experimental, or experimental) and usually includes the variables, population, and setting for the study.

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7. What is the research question?
   a. This study was undertaken to explore the effect of massage on total hours of sleep per 24-hour day, in persons averaging fewer than 7 hours of sleep per night, attributable to insomnia.
   b. It was posited that provision of daily late-morning massage would affect total hours of sleep per 24-hour day.
   c. Does massage increase the total number of hours of daily sleep?
   d. Presumably by increasing endorphin levels, massage seems to provide an immediate relaxation and an ability to sleep immediately following the session, but it is unclear whether these benefits actually extend to total sleep, despite anecdotal support.

   ANS: C
   Research objectives, questions, and hypotheses bridge the gap between the more abstractly stated research problem and purpose and the study design and plan for data collection and analysis. Objectives, questions, and hypotheses are narrower in focus than the research purpose and often (1) specify only one or two research variables, (2) identify the relationship between the variables, and (3) indicate the population to be studied. A research question is a concise, interrogative statement that is worded in the present tense and includes one or more variables (or concepts).

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8. A researcher conducting a study to examine linkages among age, gender, driver's license suspension, and zip code poverty, educational level, and income, sourced from the records of the State Department of Motor Vehicles, is using which of the following types of research?
   a. Descriptive research
   b. Correlational research
   c. Problem solving
   d. Triangulation

   ANS: B
   Through descriptive research, concepts are described and relationships are identified but not examined. A researcher conducting a study to examine linear relationships between two or more variables is using the quantitative research process for correlational research.
   In descriptive and correlational studies, no treatment is administered, so the study design centers on describing variables, examining relationships, and improving the precision of measurement. In descriptive research concepts are explored and phenomena are described in real-life situations. This approach is used to generate new knowledge about concepts or topics about which limited or no research has been conducted. In correlational research linear relationships between two or more variables are explored and the strength between variables is quantified.

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9. A student completes her master's thesis on correlates of depression in retired airline pilots, and it is shelved in the library. Has this student communicated her research findings?
   a. Yes, because the thesis is in the library and can be accessed.
   b. No, because the findings have not been made available to persons who will utilize them.
   c. Yes, because the students in this particular master's program often discuss their work in progress.
   d. No, because if the findings do not appear in print in a nursing journal, they have not been communicated.

   ANS: B
   Research is not considered complete until the findings have been communicated. Communicating research findings involves developing and disseminating a research report to appropriate audiences; the research report is disseminated through presentations and publications. Analyzing data, drawing conclusions, and writing a report of the findings are essential steps in conducting research—but they do not complete the process.

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10. Hospital nurses are observed in order to determine exactly how long nurses swab IV ports with alcohol. Because they are being observed, they "scrub the hub" longer than they ordinarily would have. This is an example of what concept relevant to quantitative research?
   a. Bias
   b. Control
   c. Inaccurate operationalization of variables
   d. Hawthorne effect

   ANS: D
   Subjects' knowledge of a study could influence their behavior and possibly alter the research outcomes. This threatens the validity or accuracy of the study design. An example of this type of threat to design validity is the Hawthorne effect, which was identified during the classic experiment at the Hawthorne plant of the Western Electric Company during the 1920s and 1930s. The employees at this plant exhibited a particular psychological response when they became research participants: they changed their behavior simply because they were subjects in a study, not because of the research treatment.

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11. A researcher studies the effect upon dental caries formation of a year-long regimen of daily rinsing with a particularly noxious-flavored oral solution, only to discover than 285 of the 300 subjects in the study have withdrawn from it by the end of the first month. Which step in the research process was not properly undertaken?
   a. Defining the purpose
   b. Conducting the literature review
   c. Selecting study variables
   d. Performing a pilot study

   ANS: D

A pilot study is commonly defined as a smaller version of a proposed study conducted to refine the methodology. It is developed much like the proposed study, using similar subjects, the same setting, the same treatment, and the same data collection and analysis techniques. Some of the reasons for conducting pilot studies are to determine feasibility, to develop a treatment or intervention, to develop an implementation protocol, to identify problems with the design, to evaluate the sampling method, to examine instrument reliability or validity, to refine instruments, to refine plans for data collection and analysis, to provide research experience, and to evaluate data analysis techniques.

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12. A researcher studies the effect of three one-hour counseling sessions on eliminating bullying behaviors in teenagers. For the dependent variable, the researcher selects the outcome of being reported to the principal's office in the two weeks following the sessions. The results of the research are dismissed by reviewers as meaningless, severely limiting generalization. What is the problem here?
    a. Theoretical limitations
    b. Not enough independent variables
    c. Methodological limitations
    d. Insufficient sample size

    ANS: A
    Limitations are restrictions or problems in a study that may decrease the generalizability of the findings. Study limitations often include a combination of theoretical and methodological weaknesses. Theoretical weaknesses in a study might include poorly developed study framework and unclear conceptual definitions of variables. The limited conceptual definitions of the variables might decrease the operationalization or measurement of the study variables. This is the case here, since a two-week measuring period is sufficient only for purposes of suppressing a behavior, not changing it. Methodological limitations result from factors such as nonrepresentative samples, weak designs, single setting, limited control over treatment (intervention), instruments with limited reliability and validity, limited control over data collection, and improper use of statistical analyses. These study limitations can limit the credibility of the findings and conclusions and restrict the population to which the findings can be generalized.

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13. Which is the *best* statement that differentiates between the sizes of samples and populations?
    a. A sample has a maximum size; a population does not.
    b. A sample cannot be the same size as a population.
    c. If a person is a member of a population, he or she is a member of the sample chosen from that population.
    d. A population is usually larger than a sample.

    ANS: D
    The population is all the elements (individuals, objects, or substances) that meet certain criteria for inclusion in a given universe. The researcher must determine which population is accessible and can be best represented by the study sample. A sample is a subset of the population that is selected for a particular study. Being a subset, the sample is either smaller than the population or, very occasionally, equal in size to it; it cannot be larger.

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14. What does a quantitative research instrument measure?
    a. The level of measurement
    b. A statistical test
    c. Itself, for validity
    d. A study variable

    ANS: D
    When conducting a quantitative study, the researcher attempts to use the most precise instruments available to measure the study variables.

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15. Which is the *highest* form of measurement?
    a. Interval
    b. Nominal
    c. Ordinal
    d. Ratio

    ANS: D
    An instrument is selected to measure a specific variable in a study. Data generated with an instrument are at the nominal, ordinal, interval, or ratio level of measurement. The level of measurement, with nominal being the lowest form of measurement and ratio being the highest, determines the type of statistical analyses that you can perform on the data.

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16. The researcher believes that adults can remember details about the first time they were taken on a camping trip, as 7-year-olds, and that the experiences of a first camping trip are life-altering. What is a research term for these beliefs?
    a. Applications
    b. Assumptions
    c. Limitations
    d. Variables

    ANS: B
    Assumptions are statements that are taken for granted or are considered true, even though they have not been scientifically tested. Assumptions are often embedded (unrecognized) in thinking and behavior, and uncovering them requires introspection. Sources of assumptions include universally accepted truths (e.g., all humans are rational beings), theories, previous research, and nursing practice. In studies, assumptions are embedded in the philosophical base of the framework, study design, and interpretation of findings. Theories and instruments are developed on the basis of assumptions that the researcher may or may not recognize. These assumptions influence the development and implementation of the research process. Since researchers' assumptions influence the logic of the study, their recognition leads to more rigorous study development.

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17. Which of the following items is different when comparing probability sampling and nonprobability sampling?
    a. The type of descriptive statistics applied to the sample
    b. The size of the sample
    c. The relative chance of being selected as a study participant
    d. Whether or not the findings can be generalized

    ANS: C
    Sampling is a process of selecting subjects, events, behaviors, or elements for participation in a study. Random sampling methods usually provide a sample that is representative of a population, because each member of the population has a probability greater than zero of being selected for a study. This is not true of nonrandom sampling methods, in which not every member of the population has an opportunity for selection to the sample. Descriptive statistics applied to the sample are identical. The size of the sample doesn't vary depending on type of sample chosen. Generalization of the findings is possible under either condition.

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18. A correlational researcher reports that the strength of the relationship between X and Y is near 0 (r = 10.03). What does this mean, relative to prediction?
    a. If X is present, Y is only somewhat likely to be present.
    b. If Y is absent, X will also be absent.
    c. If X is present, there is no guarantee at all that Y will be present.
    d. If Y is absent, X will always be present.

    ANS: C
    Correlational research examines a linear relationship between two or more variables and determines the type (positive or negative) and degree (strength) of the relationship. The strength of a relationship varies from –1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no relationship. The positive relationship indicates that the variables vary together—that is, the two variables either increase or decrease together. The negative or inverse relationship indicates that the variables vary in opposite directions; thus, as one variable increases, the other variable decreases.

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MULTIPLE RESPONSE

1. How is a researcher who exemplifies rigor similar to the best technical nurse on her shift in a cardiovascular intensive care unit? (Select all that apply.)
    a. They are both rigid and inflexible in details such as timelines and doing things the way they want to do them.
    b. They are both aggressive in acquiring and recording data.
    c. They both strive for excellence.
    d. They both communicate well with others.
    e. They both are disciplined in the way they conduct their jobs.
    f. They both are passionate about accuracy and attending to details.

    ANS: C, E, F

Rigor is striving for excellence in research and involves discipline, scrupulous adherence to detail, and strict accuracy. A rigorous quantitative researcher constantly strives for more precise measurement methods, structured treatment, representative samples, and tightly controlled study designs. Characteristics valued in these researchers include critical examination of reasoning and attention to precision.

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2. A researcher undertakes a research study on the danger of bears in Yosemite Valley. What determines the researcher's selection of a research design? (Select all that apply.)
   a. The mentor the researcher chooses to support the study
   b. Whether or not the researcher intends to generalize the findings
   c. The researcher's expertise and comfort with the research process chosen
   d. Whether the National Park Systems are funding the research
   e. The study purpose and its anticipated outcomes
   f. The body of research already present on bear danger

   ANS: B, C, E, F
   A research design is a blueprint for maximizing control over factors that could interfere with a study's desired outcome. The choice of research design depends on the researcher's expertise, the problem and purpose for the study, and the desire to generalize the findings. This means that other research in the area must be taken into consideration as well.

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3. A researcher performs a study of how many nurses are assigned to a nursing floor on the basis of total square feet of the unit, correlating this with injury, fatigue, patient assignment, patient acuity, and length of employment. Which of the following are true regarding the type of quantitative data analysis used by the researcher? (Select all that apply.)
   a. The type of quantitative data analysis guides the study objectives and hypotheses.
   b. The type of quantitative data analysis is determined by the level of measurement of data.
   c. The type of quantitative data analysis determines the research design.
   d. The type of quantitative data analysis should include some sort of numerical analysis.
   e. The kind of data that will be collected is determined by the type of analysis chosen.

   ANS: B, D
   Planning data analysis is the final step before the study is implemented. The analysis plan is based on (1) the research objectives, questions, or hypotheses; (2) the data to be collected; (3) research design; (4) researchers' expertise; and (5) availability of computer resources. Several statistical analysis techniques are available to describe the sample, examine relationships, or determine significant differences within studies. Most researchers consult a statistician for assistance in developing an analysis plan.

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4. A researcher conducts a pilot study before the main study is conducted. Why might the researcher choose to do this? (Select all that apply.)
   a. The researcher has no idea whether subjects will complete the various phases of

the study.
b. The researcher needs to know how much of a change will occur in the dependent variable, so that sample size can be determined.
c. The researcher isn't sure whether the fourth phase of the study is really necessary.
d. The study site is a new one, and the researcher wants to find out whether it's suitable for this kind of research.
e. The researcher has insufficient funding for a large study.
f. The researcher isn't sure whether the tool he or she is using to measure the dependent variable will be practical.

ANS: A, B, C, D, F
A pilot study is commonly defined as a smaller version of a proposed study conducted to refine the methodology. It is developed much like the proposed study, using similar subjects, the same setting, the same treatment, and the same data collection and analysis techniques. Some of the reasons for conducting pilot studies are to determine feasibility, to develop a treatment or intervention, to develop an implementation protocol, to identify problems with the design, to evaluate the sampling method, to examine instrument reliability or validity, to refine instruments, to refine plans for data collection and analysis, to provide research experience, and to evaluate data analysis techniques.

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5. What is applied research? (Select all that apply.)
a. Research that has been applied in the past to practice
b. Research directly useful in clinical practice
c. Research usually conducted in the setting in which it will be applied
d. Research that is conducted with paid volunteers
e. Research conducted to generate knowledge that will directly and indirectly influence or improve clinical practice

ANS: B, C, E
Basic, or pure, research is a scientific investigation that involves the pursuit of "knowledge for knowledge's sake," or for the pleasure of learning and finding truth. The purpose of basic research is to generate and refine theory and build constructs; thus, the findings are frequently not directly useful in practice. Applied, or practical, research is a scientific investigation conducted to generate knowledge that will directly influence or improve clinical practice. The purpose of applied research is to solve problems, to make decisions, or to predict or control outcomes in real-life practice situations.

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6. A marketing researcher reviews the month's sales slips for a convenience store and compares them with restocking orders, in order to determine which products are being stolen from the shelves. This study has little control. Why is this the case? (Select all that apply.)
a. The researcher has no control over whether people choose to shoplift.
b. There is no control for extraneous variables.
c. No variables are manipulated.
d. The design is descriptive or correlational; as compared with other types of research, control is low.
e. The data collected were actually generated by other people and may be erroneous.

ANS: B, C, D, E
Control occurs when the researcher imposes "rules" to decrease the possibility of error and thus increase the probability that the study's findings are an accurate reflection of reality. Through control, the researcher can reduce the influence or confounding effect of extraneous variables on the study variables. Quantitative research requires varying degrees of control, ranging from minimal control to high control of study design. Descriptive and correlational studies are usually conducted with minimal or partial control of the study design. Correlational research often has more control of its design than does descriptive research. Quasi-experimental studies are usually conducted with moderate control of study design. Experimental studies are highly controlled.

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7. In a given research study, the findings reveal that as A increases, B also increases, that the relationship is linear, and that the strength of the relationship is 0.78. What type of relationship is this? (Select all that apply.)
   a. Positive
   b. Negative
   c. Inverse
   d. None
   e. Causational
   f. Correlational

   ANS: A, F
   Correlational research examines a linear relationship between two or more variables and determines the type (positive or negative) and degree (strength) of the relationship. The strength of a relationship varies from –1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no relationship. The positive relationship indicates that the variables vary together—that is, the two variables either increase or decrease together. The negative or inverse relationship indicates that the variables vary in opposite directions; thus, as one variable increases, the other variable decreases.

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8. A researcher selects a quantitative experimental research design. For what reasons does the researcher select this particular design? (Select all that apply.)
   a. To generate a theory
   b. To answer a research question
   c. To determine which of several causes is the true one
   d. To prove a theory
   e. To disprove a hypothesis
   f. To determine the strength of the relationship between the independent variable and the dependent variable

   ANS: B, F
   A research design is a blueprint for maximizing control over factors that could interfere with a study's desired outcome. The choice of research design depends on the researcher's expertise, the problem and purpose for the study, and the desire to generalize the findings. This means that other research in the area must be taken into consideration as well.

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9. The director of a major hospital complex conducts a study to discover the types of critical incidents that have occurred in this hospital and its sister hospital over the past five years. She makes a list of every critical incident that has occurred over this period. Choose the true statements about this list. (Select all that apply.)
   a. The list is the dependent variable.
   b. The list represents the hospital director's assumptions.
   c. The list is an extraneous variable.
   d. The list represents the sample.
   e. If the two hospitals have been in operation only five years, the list represents the population.

   ANS: A
   The population is all the elements (individuals, objects, or substances) that meet certain criteria for inclusion in a given universe. The researcher must determine which population is accessible and can be best represented by the study sample. A sample is a subset of the population that is selected for a particular study. Being a subset, the sample is either smaller than the population or, very occasionally, equal in size to it; it cannot be larger.

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