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I went in—after making every possible noise in the kitchen, short of pushing over the stove—but I don't believe they heard a sound. They were sitting at either end of the couch, looking at each other as if some question had been asked, or was in the air, and every vestige of embarrassment was gone. Daisy's face was smeared with tears, and when I came in she jumped up and began wiping at it with her handkerchief before a mirror. But there was a change in Gatsby that was simply confounding. He literally glowed; without a word or a gesture of exultation a new well-being radiated from him and filled the little room.

"Oh, hello, old sport," he said, as if he hadn't seen me for years. I thought for a moment he was going to shake hands.

"It's stopped raining."

"Has it?" When he realized what I was talking about, that there were twinkle-bells of sunshine in the room, he smiled like a weather man, like an ecstatic patron of recurrent light, and repeated the news to Daisy. "What do you think of that? It's stopped raining."

"I'm glad, Jay." Her throat, full of aching, grieving beauty, told only of her unexpected joy.

"I want you and Daisy to come over to my house," he said. "I'd like to show her around."

"You're sure you want me to come?"

"Absolutely, old sport."

Daisy went upstairs to wash her face—too late I thought with humiliation of my towels—while Gatsby and I waited on the lawn.

"My house looks well, doesn't it?" he demanded. "See how the whole front of it catches the light."

I agreed that it was splendid.

"Yes." His eyes went over it, every arched door and square tower. "It took me just three years to earn the money that bought it."

"I thought you inherited your money."

"I did, old sport," he said automatically, "but I lost most of it in the big panic—the panic of the war."

I think he hardly knew what he was saying, for when I asked him what business he was in he answered: "That's my affair," before he realized that it wasn't an appropriate reply.

"Oh, I've been in several things," he corrected himself. "I was in the drug business and then I was in the oil business. But I'm not in either one now." He looked at me with more attention. "Do you mean you've been thinking over what I proposed the other night?"

Before I could answer, Daisy came out of the house and two rows of brass buttons on her dress gleamed in the sunlight.

"That huge place *there*?" she cried pointing.

"Do you like it?"

"I love it, but I don't see how you live there all alone."

"I keep it always full of interesting people, night and day. People who



do interesting things. Celebrated people."

Instead of taking the short-cut along the Sound we went down to the road and entered by the big postern. With enchanting murmurs Daisy admired this aspect or that of the feudal silhouette against the sky, admired the gardens, the sparkling odor of jonquils and the frothy odor of hawthorn and plum blossoms and the pale gold odor of kiss-me-at-the-gate. It was strange to reach the marble steps and find no stir of bright dresses in and out the door, and hear no sound but bird voices in the trees.

And inside, as we wandered through Marie Antoinette music-rooms and Restoration salons, I felt that there were guests concealed behind every couch and table, under orders to be breathlessly silent until we had passed through. As Gatsby closed the door of "the Merton College Library" I could have sworn I heard the owl-eyed man break into ghostly laughter.

We went upstairs, through period bedrooms swathed in rose and lavender silk and vivid with new flowers, through dressing-rooms and pool-rooms, and bathrooms with sunken baths—intruding into one chamber where a dishevelled man in pajamas was doing liver exercises on the floor. It was Mr. Klipspringer, the "boarder." I had seen him wandering hungrily about the beach that morning. Finally we came to Gatsby's own apartment, a bedroom and a bath, and an Adam study, where we sat down and drank a glass of some Chartreuse he took from a cupboard in the wall.

He hadn't once ceased looking at Daisy, and I think he revalued everything in his house according to the measure of response it drew from her well-loved eyes. Sometimes, too, he stared around at his possessions in a dazed way, as though in her actual and astounding presence none of it was any longer real. Once he nearly toppled down a flight of stairs.

His bedroom was the simplest room of all—except where the dresser was garnished with a toilet set of pure dull gold. Daisy took the brush with delight, and smoothed her hair, whereupon Gatsby sat down and shaded his eyes and began to laugh.

"It's the funniest thing, old sport," he said hilariously. "I can't—When I try to—"

He had passed visibly through two states and was entering upon a third. After his embarrassment and his unreasoning joy he was consumed with wonder at her presence. He had been full of the idea so long, dreamed it right through to the end, waited with his teeth set, so to speak, at an inconceivable pitch of intensity. Now, in the reaction, he was running down like an overwound clock.

Recovering himself in a minute he opened for us two hulking patent cabinets which held his massed suits and dressing-gowns and ties, and his shirts, piled like bricks in stacks a dozen high.

"I've got a man in England who buys me clothes. He sends over a selection of things at the beginning of each season, spring and fall."

He took out a pile of shirts and began throwing them, one by one, before us, shirts of sheer linen and thick silk and fine flannel, which lost their folds as they fell and covered the table in many-colored disarray. While we admired he brought more and the soft rich heap mounted higher—shirts with



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4. A 20-year study of 5000 British adults noted four bad habits: smoking, drinking, inactivity, and poor diet. The study looked to show that there is a higher death rate (proportion who die in a 20-year period) among people with all four bad habits than among people with none of the four bad habits.

- (a) Was this an experiment or observational study? Explain.
- (b) What are the null and alternative hypotheses?
- (c) What would be the result of a Type I error?
- (d) What would be the result of a Type II error?

Of the 314 people who had all four bad habits, 91 died during the study, while of the 387 people with none of the four bad habits, 32 died during the study.

- (e) Calculate and interpret the  $P$ -value in context of this study.

5. It is estimated that 17.4% of all U.S. households own a Roth IRA. The American Association of University Professors (AAUP) believes this figure is higher among their members and commissions a study. If 150 out of a random sample of 750 AAUP members own Roth IRAs, is this sufficient evidence to support the AAUP belief?

6. A long accepted measure of the discharge rate (in 1000 ft<sup>3</sup>/sec) at the mouth of the Mississippi River is 593. To test if this has changed, ten measurements at random times are taken: 590, 596, 592, 588, 589, 594, 590, 586, 591, 589. Is there statistical evidence of a change?

7. A behavior study of high school students looked at whether a higher proportion of boys than girls met a recommended level of physical activity (increased heart rate for 60 minutes/day for at least 5 days during the 7 days before the survey). What is the proper conclusion if 370 out of a random sample of 850 boys and 218 out of an independent random sample of 580 girls met the recommended level of activity?

8. In a random sample of 35 NFL games the average attendance was 68,729 with a standard deviation of 6,110, while in a random sample of 30 Big 10 Conference football games the average attendance was 70,358 with a standard deviation of 9,139. Is there evidence that the average attendance at Big 10 Conference football games is greater than that at NFL games?

9. A study is proposed to compare two treatments for patients with significantly narrowed neck arteries. Some patients will be treated with surgery to remove built-up plaque, while others will be treated with stents to improve circulation. The response variable will be the proportion of patients who suffer a major complication such as a stroke or heart attack within one month of the treatment. The researchers decide to block on whether or not a patient has had a mini stroke in the previous year.

- (a) There are 1000 patients available for this study, half of whom have had a mini stroke in the previous year. Explain a block design to assign patients to treatments.
- (b) Give two methods other than blocking to increase the power of detecting a difference between using surgery versus stents for patients with this medical condition. Explain your choice of methods.



10. A car simulator was used to compare effect on reaction time between DWI (driving while intoxicated) and DWT (driving while texting). Ten volunteers were instructed to drive at 50 mph and then hit the brakes in response to the sudden image of a child darting into the road. A baseline stopping distance was established for each driver. Then one day each driver was tested for stopping distance while driving while texting, and another day the driver was tested after consuming a quantity of alcohol. For each driver, which test was done on the first day was decided by coin toss. The following table gives the extra number of feet necessary to stop at 50 mph for each driver for DWI and DWT.

DWI	30	26	28	35	42	33	36	28	27	37
DWT	30	31	25	39	45	32	38	30	28	38

The sample means are  $\bar{x}_{DWI} = 32.2$ ,  $\bar{x}_{DWT} = 33.6$ , and a two-sample  $t$ -test,  $H_0: \mu_{DWI} = \mu_{DWT}$   $H_a: \mu_{DWI} \neq \mu_{DWT}$  gives a  $P$ -value of 0.590, and a conclusion that there is no evidence of a difference between the effect on reaction time between DWI and DWT. Explain why this is not the proper hypothesis test, and then perform the proper test.

### SIX INVESTIGATIVE TASKS

1. An exercise electrocardiogram (EKG) checks for changes in your heart during exercise and is useful in diagnosing coronary artery disease. An EKG has fewer potential side effects but is much less precise than thallium tomography. In one EKG study, 500 volunteers with known coronary artery disease and 500 volunteers with healthy arteries underwent EKG checks. The physicians administering and evaluating the tests did not know the physical condition of any volunteer. The following table gives the numbers of volunteers whom the physicians evaluated as "positive" for coronary disease.

	Test for coronary disease	
	Positive	Negative
Healthy volunteers	100	400
Volunteers with disease	305	195

- (a) *Sensitivity* is defined as the probability of a positive test given that the subject has disease. What was the sensitivity of this study?
- (b) *Specificity* is defined as the probability of a negative test given that the subject is healthy. What was the specificity of this study?
- (c) A valuable tool for assessing the accuracy of such studies is the *positive diagnostic likelihood ratio* ( $LR^+$ ) which gives the ratio of the probability a positive test result will be observed in a diseased person compared to the probability that the same result will be observed in a healthy person.

$$LR^+ = \frac{\text{sensitivity}}{1 - \text{specificity}}$$

What was  $LR^+$  in this study, and explain why the larger the value of  $LR^+$ , the more useful the test.