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UNEMPLOYMENT THROUGH THE FILTER OF MEMORY*

GEORGE A. AKERLOF AND JANET L. YELLEN

This paper uses data from the annual Work Experience Survey to construct a new unemployment series based on respondents' recollection of unemployment over the previous year. It is argued that the ratio of this new series to the official series computed from the monthly Current Population Survey provides an index of the "salience" or painfulness of unemployment. Over the past two decades this ratio has declined secularly. About 30 percent of this decrease is due to shifts in the composition of unemployment toward demographic groups with low ratios of remembered to currently reported unemployment. The remainder is due to a secular decline in salience for younger and older people.

I. INTRODUCTION

This paper presents a new annual index of unemployment from 1960 to 1981. This index uses retrospective reporting of unemployment experience to reconstruct the aggregate unemployment weeks remembered for the preceding calendar year. The data are taken from the annual Work Experience Survey, which is based on the Income Supplement to the March Current Population Survey. Thus, although the questions regarding unemployment differ, the sampling population is identical to that of the Current Population Survey from which the official unemployment statistics are derived.

For some time now it has been known that there are differences between unemployment reported retrospectively in the Work Experience Survey and the unemployment currently reported in the Current Population Survey for the same calendar periods. (See O'Neill [1972], Morgenstern and Barrett [1974], Clark and Summers [1979], and Horvath [1982].) The innovation of this paper is to view the ratio between u_{WES} , the unemployment rate derived from the Work Experience Survey, and u_{CPS} , the unemployment rate derived from the Current Population Survey, as yielding important information regarding the "seriousness" or

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"salience" of unemployment. In the view of this paper, persons will tend to remember more of their unemployment if it is serious for them than if it has relatively little personal importance. Psychological theory, survey research, and common sense suggest that more serious events are better remembered. In addition, the cross-section and time series behavior of the u_{WES}/u_{CPS} ratio is consistent with the "salience" hypothesis; this ratio is larger for those groups and in those times when unemployment assessed by other indicators seems to be more serious.

It is a question of considerable importance whether unemployment is less serious than in the past. Certainly such a hypothesis is a corollary to Feldstein's "New View of Unemployment" (see, for example, Feldstein [1973]). According to Feldstein, not only is the average spell of unemployment of very short duration, but also much unemployment results in very high Net Replacement Ratios. The Net Replacement Ratio is the proportion of an unemployed worker's lost income that is "replaced" by unemployment insurance and reduced taxes. The historical trends of increasing marginal tax rates, broadened coverage of unemployment insurance, and an increasing number of secondary earners in the labor force all contribute to increasing this ratio. On the basis of these trends it could well be supposed that unemployment has become less financially burdensome.

In support of this view, we find that as a function of u_{WES} , u_{CPS} has increased at a trend rate of about 0.85 percent per year from 1960 to 1981. Thus, our results are consistent with recent findings of Burtless [1983], Medoff [1983], and others that there has been a growing divergence between u_{CPS} and other measures of labor market tightness.¹ Roughly 30 percent of this increase can be explained by increasing labor force proportions of groups that understate their unemployment experience in recall data relative to current data. In addition, there have been significant increases in u_{CPS} , for given levels of u_{WES} , for younger men and younger women (aged 16 to 24) and also for older women (aged 55 and over). For older men the estimated trend rate of increase is fairly large but not statistically significant. But for both prime age men (aged 24 to 55) and prime age women there has been no change in u_{CPS} , given u_{WES} , after adjustment for changes in un-

1. See Hall [1983] for an interesting discussion of the existing array of evidence.

employment definition.² For these two groups the index of this paper indicates that the meaning of unemployment is unchanged. (It is, of course, natural to ask whether the new unemployment series u_{WES} fits better a Phillips relation than the standard unemployment series u_{CPS} . Because of multicollinearity, it was impossible to discriminate between the two series as indices of the causes of wage change.)³

The plan of this paper is as follows. Section II describes the new u_{WES} series and compares the behavior over time of the aggregate u_{WES} and u_{CPS} series. Section III outlines the psychological theory and previous survey research that justify the interpretation of the u_{CPS}/u_{WES} ratio as a measure of pain. Cross-section and time series results for demographic subgroups are presented that lend support to this interpretation. Section IV computes the extent to which the change in the aggregate u_{CPS}/u_{WES} ratio is due to changes in the relative proportions of labor force groups with different average u_{CPS}/u_{WES} ratios. Section V analyzes the changes that have occurred in u_{CPS} relative to u_{WES} for various demographic subgroups. Section VI offers some concluding comments.

II. THE u_{WES} SERIES

In March of every year, a series of questions contained in the "Income Supplement to the Current Population Survey" is added to the normal CPS interview. The questions that pertain to household members' work experience in the preceding calendar year are known as the Work Experience Survey. The Work Experience Survey contains information on the total number of unemployment weeks of the aggregate population over 16 and various demographic subgroups for the preceding calendar year. This information is the basis for the new unemployment series of this

2. For prime age men, u_{CPS} has remained almost constant for given levels of u_{WES} from 1960 to 1981. There was a shift in u_{CPS} , for given u_{WES} , for prime age women. A large part of this shift appears to have occurred in 1967, coincidental with the changes in the CPS introduced because of the Gordon Report [1962]. These changes are described in greater detail below. See footnote 9.

3. We have performed a number of simple experiments, using annual data, to see whether u_{WES} performs better than u_{CPS} as a measure of labor market slack in Phillips curve equations explaining changes in labor compensation. Each series is individually significant in such an equation; however, due to the high degree of multicollinearity between the series, neither unemployment rate is significant when both are included.

paper. The definitions of unemployment for the WES and the CPS are almost exactly the same, and the differences in population are sufficiently minor that they can be safely ignored.⁴ But in contrast to the CPS, the WES relies on memory two to fourteen months after the event.⁵

4. There is a *slight* difference in the populations in the monthly CPS and in the Work Experience Survey. Consider the March 1982 Work Experience Survey for 1981. The unemployment reported in this survey refers to the unemployment weeks of the civilian population *as of March, 1982*. In contrast, the CPS survey for each month of 1981 reports the unemployment of the civilian population in *each respective month of 1981*. Although, conceivably, in time of rapid military buildup this difference might be significant for younger people, we considered it sufficiently minor that no adjustment was made in comparing the CPS and WES unemployment rates. Differences between the u_{WES} and u_{CPS} concepts of unemployment are described in Bowers, Horvath, and Terry [1982].

5. The WES concerns unemployment over a span of time, whereas the CPS concerns unemployment at a point in time. Because of this difference between the CPS and the WES, of necessity the questions must differ somewhat. The WES must leave more scope to the respondent to define the duration of the unemployment experience. The CPS determines whether an individual, "Doty" (corresponding to the dots in the questionnaire forms), is unemployed by the following sequence of questions [Interviewers Reference Manual, CPS-250]. It is first asked: "Did Doty do any work at all *last week*, not counting work around the house?" If no, the interviewer continues, "Has Doty been looking for work during the past four weeks?" The interviewers' manual provides a detailed list of activities that qualify as "looking for work." If yes, the interviewer asks: "What has Doty been doing in the last four weeks to find work?" "Is there any reason why Doty could not take a job last week?" If Doty did not work, and did not search for work, the interviewer asks: "Did Doty have a job from which he/she was temporarily absent or on layoff last week?" If yes, "Why was Doty absent from work last week?" Persons who were not at work, searched for work for most of the survey week, and also were willing to work are classified as unemployed. In addition, those persons who are on layoff from a job or are waiting to start a job in the next thirty days are also considered unemployed. In contrast to the CPS, the Work Experience Survey would calculate Doty's number of weeks of unemployment in 1981, for example, from the following questions asked in March, 1982 [Income Supplement Form CPS-665, 1982]. The interviewer first asks: "Did Doty work at a job or business at any time during 1981?" If yes, the number of unemployment weeks in 1981, if any, are calculated from the answers to the next three questions: "During 1981, in how many weeks did Doty work for even a few hours? *Include paid vacation and sick leave as work.*" "Did Doty lose any full weeks of work in 1981 because he/she was on layoff from a job or lost a job?" "You said Doty worked about . . . weeks in 1981. How many of the remaining weeks was Doty looking for work or on layoff from a job?" If Doty had no work experience in 1981, the number of unemployment weeks is calculated from answers to the following two questions: "Even though Doty did not work in 1981, did he/she spend any time trying to find a job or on layoff?" "How many different weeks was Doty looking for work or on layoff from a job?" As can be seen from the difference in the two sets of questions, there are three slight differences in *definition* of unemployment between the CPS and the WES. First, the WES does not include as unemployed persons who did not look for work but are waiting to start a job in the next thirty days. Second, Doty is unemployed in the CPS if he/she did not work during the last seven days but searched for work in the last *four* weeks. In contrast, the Work Experience Survey adds up all the *individual* weeks of search by persons without jobs to calculate unemployment weeks. Finally, the Work Experience Survey omits the CPS "verification question" testing that the person who searched for work was also available.

The annual reports on the Work Experience Survey show the distribution of the number of weeks of unemployment both for the total population and for subgroups of the population. By assuming that the mean number of weeks of unemployment of persons in any closed interval is the midpoint (for example, the mean number of weeks of unemployment of those with 10 to 15 weeks is 12.5) and by assuming that the mean of those persons with 27 to 52 is 44, we estimated the number of unemployment weeks reported in the WES for the total population and also for six age-sex subgroups.⁶ Using estimates of the labor force from the CPS yields an alternative unemployment series.⁷ These are reported in Table I for the aggregate population and in Table II for each of six separate age-sex groups. Each of these tables also presents the CPS unemployment rate u_{CPS} corresponding to its u_{WES} counterpart.

Simple inspection of the aggregate numbers for 1960 to 1981 shows a pattern that is also revealed more formally by regression analysis. As the economy recovered from the 1959–1961 recession, u_{WES} declined considerably more rapidly than u_{CPS} . This is indicative of the greater cyclicality of the WES than of the CPS series. By the late 1970s, however, u_{WES} is uniformly lower than u_{CPS} in spite of the fact that u_{WES} increases more than u_{CPS} with downturns in the cycle, and despite consistently high levels of u_{CPS} . Thus, it appears that u_{WES} has decreased secularly relative to u_{CPS} .

This behavior is statistically summarized by a regression of the natural logarithm of the aggregate CPS unemployment rate

6. We followed Morgenstern and Barrett [1974] in choosing 44 weeks as the mean number of weeks unemployed for those in the 27-to-52-week category. They write, "The number 44 is based on the assumption, as found by Vladimir Woytinski [1942] and Hyman B. Kaitz [1970] that the probability is quite high of remaining unemployed one more week after having been unemployed 27 weeks—on the order of 0.92–0.95. . . . Perhaps the most noteworthy aspect of this problem, however, is that because there are so few people in this category the results of this note are extremely insensitive to the point estimates used for this category. Experimentation with different values, including the use of different values for different race-sex groups, has demonstrated this" [footnote, p. 355].

7. Our calculations of unemployment rates for years prior to 1967 involve several additional approximations. Due to the unavailability of the desired breakdowns by age prior to 1967, we estimated the fractions of unemployment falling in the 25–54 and 55 and over age categories using information on this breakdown from later years. Further approximations were necessitated by the occasional absence of data on the distribution of unemployment by number of weeks for years prior to 1967. In some instances, unpublished data on these distributions was provided by BLS.

TABLE I

THREE MEASURES OF THE AGGREGATE UNEMPLOYMENT RATE, 1960-1981^a

Year	WES unemployment rate (U_{WES})	CPS unemployment rate (U_{CPS})	CPS unemployment rate adjusted for trend differences in U_{WES} and U_{CPS} (\hat{U}_{CPS})
1960	5.9	5.6	5.6
1961	6.4	6.7	6.7
1962	6.1	5.6	5.5
1963	5.6	5.7	5.6
1964	5.1	5.2	5.0
1965	3.8	4.5	4.3
1966	3.1	3.8	3.6
1967	3.0	3.9	3.6
1968	2.8	3.6	3.3
1969	2.9	3.5	3.2
1970	4.5	4.9	4.5
1971	5.5	5.9	5.4
1972	4.9	5.6	5.0
1973	4.0	4.9	4.3
1974	5.0	5.6	4.9
1975	7.7	8.5	7.4
1976	7.0	7.7	6.7
1977	6.1	7.0	6.1
1978	5.0	6.0	5.1
1979	4.7	5.8	4.9
1980	6.5	7.1	6.0
1981	7.0	7.6	6.3

a. Data for 1960-1964 are for persons 14 years and over; data for 1965-1981 are for persons 16 years and over.

on the natural logarithm of the aggregate WES unemployment rate and time:⁸

$$(1) \quad \ln(u_{CPS}) = 0.416 + 0.752 \ln(u_{WES}) + 0.00875 \text{ time}$$

(0.045) (0.028) (0.00132)

Summary statistics:

R^2 : 0.98

Standard error: 0.038

Durbin-Watson: 2.48.

8. If u_{WES} is measured with greater error than u_{CPS} , its use on the right-hand side of equation (1) could bias the coefficients. Accordingly, we also ran all reported regressions with u_{WES} as the dependent variable instead of u_{CPS} . The results are completely unchanged when the roles of u_{WES} and u_{CPS} are thus reversed.

TABLE II
 A COMPARISON OF UNEMPLOYMENT RATES DERIVED FROM THE CURRENT POPULATION SURVEY (U_{CPS}) AND THE WORK EXPERIENCE SURVEY (U_{WES}) FOR SIX AGE-SEX SUBGROUPS OF THE POPULATION, 1960-1981

Year	Demographic group											
	Men						Women					
	16-24 ^a		25-54		55 and older		16-24 ^a		25-54		55 and older	
	U_{CPS}	U_{WES}	U_{CPS}	U_{WES}	U_{CPS}	U_{WES}	U_{CPS}	U_{WES}	U_{CPS}	U_{WES}	U_{CPS}	U_{WES}
1960	10.8	11.3	4.9	4.2	6.0	4.5	7.0	10.5	5.3	5.0	4.6	3.2
1961	10.7	12.9	5.5	5.1	6.2	5.7	8.0	12.2	5.9	6.2	5.6	4.4
1962	10.5	10.9	5.1	4.0	6.2	4.6	7.5	11.1	5.3	5.2	5.7	3.6
1963	9.3	11.8	4.4	3.8	5.7	4.4	7.8	12.1	5.4	5.3	5.2	3.5
1964	8.6	10.9	3.9	3.2	4.8	3.9	7.4	11.6	4.9	5.0	4.8	3.5
1965	6.4	9.5	3.0	2.7	3.7	3.3	5.5	10.9	3.6	4.3	3.7	2.8
1966	5.2	7.7	2.2	2.1	3.0	2.7	5.0	9.7	3.1	3.6	3.3	2.4
1967	5.5	7.9	2.1	1.9	2.7	2.5	5.0	9.7	2.9	4.1	2.8	2.5
1968	5.2	7.8	1.8	1.7	2.1	2.1	5.5	9.7	2.7	3.4	2.4	2.3
1969	5.3	7.8	2.0	1.6	2.3	1.9	4.7	9.1	2.7	3.5	2.6	2.2
1970	8.9	11.1	3.3	2.8	3.6	2.9	6.5	11.0	3.9	4.5	3.5	2.8
1971	10.8	12.8	4.0	3.5	4.1	3.4	8.6	12.6	4.8	5.3	3.9	3.4
1972	9.4	11.9	3.6	3.1	3.2	3.3	8.0	12.3	4.3	4.9	3.4	3.4
1973	7.2	9.9	2.8	2.5	2.7	2.5	6.5	11.2	3.7	4.4	3.3	2.8
1974	8.9	11.4	3.8	3.1	3.5	2.7	7.9	12.3	4.2	4.9	4.4	3.3
1975	13.1	16.6	6.2	5.7	5.5	4.5	10.7	15.5	6.8	7.5	5.9	5.1
1976	12.4	14.8	5.7	4.9	5.1	4.4	9.6	14.6	6.2	6.8	4.9	4.9
1977	10.8	13.3	4.7	4.3	4.2	3.9	8.8	14.0	5.5	6.4	4.1	4.5
1978	8.5	11.7	3.9	3.4	3.5	3.1	7.5	12.8	4.4	5.4	3.3	3.3
1979	8.3	11.3	3.9	3.4	2.9	2.9	6.8	12.2	4.3	5.2	2.9	3.2
1980	11.5	14.6	5.7	5.1	3.7	3.3	8.8	12.9	5.6	6.0	3.5	3.2
1981	12.5	15.7	6.4	5.5	4.1	3.5	9.3	14.0	5.9	6.3	3.7	3.8

a. This group includes 14 and 15 year olds for years prior to 1965.

(Numbers in parentheses are standard errors. The coefficient of $\ln(u_{WES})$ is significantly different from unity at the 0.5 percent level.)

The regression was also run with a dummy variable $DUM67$, which is zero before 1967 and one thereafter, reflecting the change of definition of unemployment in the CPS introduced in 1967:⁹

$$(2) \quad \ln(u_{CPS}) = 0.413 + 0.754 \ln(u_{WES}) \\ + 0.00847 \text{ time} + 0.00442 DUM67 \quad (0.052) \quad (0.033) \\ (0.00258) \quad (0.0339)$$

Summary Statistics:

R^2 : 0.98

Standard Error: 0.038

Durbin-Watson: 2.47.

Regressions (1) and (2) confirm the analysis of the last paragraph. As the unemployment rate rises, the WES unemployment rate rises faster than the CPS rate. Also over time the WES rate has been rising more slowly than the CPS rate.

If u_{WES} is actually a measure that filters out that search activity or layoff unemployment that is not memorable, it may well be a better measure of labor market tightness than the official rate. Under the assumption that constant levels of u_{WES} actually correspond to constant levels of tightness in the labor market, it is straightforward to compute the level of labor market tightness in 1960, in terms of the CPS unemployment rate, which corresponds to the unemployment rates of subsequent years. (Since u_{CPS} is the most familiar gauge of the economy, it is worthwhile to use its scale.) Column 3 of Table I gives such a 1960-eye view of the CPS unemployment rate. This column presents the actual CPS unemployment rate in each year deflated by the trend amount of divergence since 1960 between u_{CPS} and u_{WES} consistent with Regression (1). This adjusted CPS series is called \hat{u}_{CPS} . By 1981, u_{CPS} exceeds \hat{u}_{CPS} by 20 percent.

9. The major change in questionnaire with respect to unemployment introduced in the CPS in 1967 as a result of the Gordon Report consisted of replacing the single question, "Was Dotty looking for work?" with three questions: "Has Dotty been looking for work during the past four weeks?" If yes, "What has Dotty been doing in the last four weeks?" "Is there any reason why Dotty could not take a job last week?" See Stein [1967].

III. THE u_{CPS}/u_{WES} RATIO AS A MEASURE OF PAIN

The differences between u_{WES} and u_{CPS} are interpreted in this paper as reflecting the painfulness or "salience" of unemployment.¹⁰ This interpretation is supported by psychological theory, by evidence from survey research, and also by the cross-section and time series behavior of the data.

1. *Psychological Theory*

There are three types of error involved in recall of search activity during a specified reference period. One error involves loss of memory of unemployment spells; the second error concerns incorrect estimation of the duration of a remembered unemployment spell (or spells).¹¹ The third error, known as "telescoping," involves incorrect dating of a remembered episode; a respondent may report spells actually having occurred outside the reference period as occurring within it and vice versa. It is therefore worthwhile to review existing psychological literature and survey research findings in regard both to memory and to estimation of time.

Psychology of Memory. With regard to long-term memory experimental psychologists have demonstrated that memories decay over time, as in the standard economic model of depreciation [Wingfield and Byrnes, 1981]. Abundant evidence from survey research shows that reported occurrence rates for many different types of event diminish as the reference period is lengthened.

10. Respondents in the Work Experience Survey are constrained to allocate *precisely* 52 weeks among the three possible states of "employment," "unemployment," and "out of the labor force." Implicitly this means that the "salience" of an unemployment or employment spell can only be measured relative to the salience of time spent out of the labor force. Thus, a decrease in the salience of unemployment could result either from an improvement in the quality of time spent out of the labor force or from a reduction in the financial, social, or psychological toll of unemployment spells.

11. Ideally, we would like to compute separate series on the number of remembered spells and the average length of remembered spells. Unfortunately, data limitations prevent us from compiling a reliable series on the total number of remembered spells during a calendar year. However, a crude series can be computed using available data on the total number of persons reporting one, two, or three or more spells. Dividing total remembered unemployment weeks by the number of remembered spells gives an average remembered spell duration statistic. We regressed a completed spell duration series derived from CPS data against our series and time and found a positive but insignificant time coefficient. This suggests that a large part of the time trend in the u_{CPS} relative to u_{WES} results from increased forgetting of spells reported in the monthly CPS and not just from greater divergence between currently reported and remembered spell durations. A caveat, however, is that our duration statistic does not correspond precisely to the average length of *completed* spells because some remembered spells during the WES reference period are interrupted spells.

(This literature is surveyed by Sudman and Bradburn [1973].) The problem with this simple theory is that it fails to identify the determinants of the rate of decay. As in the case of rust, where the process of oxidation is at work, there may also be a deeper process in the case of memory. One possibility that psychological theory emphasizes is that memory loss occurs because of *interference*. This interference may be from occurrences after the event (retroactive interference) or else from occurrences prior to the event (proactive interference) (see Wingfield and Byrnes [1981], pp. 39–42). And while there may be interference that causes forgetting, there may also be “retrieval cues” that positively reinforce existing memories (see Gleitman [1981], pp. 301–02). Items that can be easily organized in thought tend to be easily remembered, presumably because of the generation of “retrieval cues,” whereas items such as nonsense syllables, which are not easily organized, tend to be forgotten. In the words of a recent survey on the psychology of memory: “This final form of memory storage is presumed to be of the longest duration and involves the coding of the true meaning of an event. Usually referred to as long-term memory, events are placed in the context of other related events or concepts. If events are related meaningfully to what we know, these events can be remembered much longer than, for example, a list of nonsense syllables” [Wingfield and Byrnes, p. 11]. This naturally suggests that the “salience” of an event will be a key determinant of the rate of memory decay. This hypothesis—that more salient events are less rapidly forgotten—appears frequently in the literature on survey research (see, for example, Sudman and Bradburn [1974] and Bushery [1981]).¹² In regard to unemployment, a painful spell of unemployment will surely have more interconnections with the rest of a person’s life, and there are likely to be more “retrieval cues” than for unemployment that is less salient.

Most work by experimental psychologists on memory has been rather narrowly concerned with the memory of information as opposed to the memory of *emotional* experiences. It is important

12. Sudman and Bradburn [1973] develop a theoretical model designed to distinguish between telescoping and memory decay. In an empirical test of their model, Sudman and Bradburn use data from a study of house repairs and alterations [Neter and Waksberg, 1964] to estimate the parameters of the response error model. In support of the salience hypothesis, they find that the rate of memory decay is inversely related to salience.

to remember, therefore, that Freudian theory predicts that the memory of traumatic emotional events may be repressed due to the inability of the individual to deal with the anxieties inherent in such memories (see Breger [1974], pp. 199–214, and Gleitman [1981]. Evidence from survey research [Sudman and Bradburn, 1973] confirms that omissions in reporting are significantly higher when individuals are questioned about threatening topics for recall periods of three months or more. In summary, psychological theory suggests that events will be less likely forgotten the more important they are in a person's life, provided that these events are not traumatic in nature. It will be seen shortly that this prediction corresponds exactly to the results of sixteen separate studies of recall bias in surveys.

Psychology of Time Durations. Not only does unbiased recall of unemployment in the Work Experience Study involve correctly remembering that search for a job took place, but also it involves the correct memory of the duration of time that the person in question was searching for a job.

Most experimental work in the psychology of time involves, for obvious reasons, short time durations. For that reason, this literature is not directly useful, but nevertheless it is quite suggestive of a hypothesis that also coincides with common sense. In many short-term experiments people who are kept busy underestimate the calendar time that has passed, whereas persons who are kept idle overestimate the time that has passed (see Fraisse [1963], p. 225). For this reason persons who were idle while unemployed can be expected to overreport the duration, while people who were quite busy can be expected to underreport the duration. It will be seen below that such a hypothesis is in concert with the facts.

Telescoping. Survey researchers have frequently observed that even when omission errors are not present or are corrected, the total number of events reported to have occurred during a given time interval is often overstated, particularly for frequently occurring events. Telescoping usually involves overreporting because the respondent includes events occurring prior to the reporting period. This is probably due to the respondent's desire to please the surveyor by performing the task required of him, giving more rather than less information when in doubt. The effect of salience of an event on the tendency to overstate due to telescoping is clear neither in theory nor in practice (see Murphy and Cowen,

[1976]¹³ and Sudman and Bradburn [1973]).¹⁴ However, theory does suggest [Sudman and Bradburn, 1973] that as the reporting period becomes long, as in the Work Experience Survey, telescoping should become relatively unimportant in comparison with omissions, in determining response errors. Furthermore, although telescoping could account for some divergence between u_{WES} and u_{CPS} , there is no reason to suppose that it explains either secular change in the u_{WES}/u_{CPS} ratio, which has occurred or the differences in this ratio across demographic groups.

2. Survey Research

For obvious practical reasons the literature on survey research has studied the problem of recall bias. We were able to find sixteen studies that involved the recall of events whose salience could be easily ranked. A review of these surveys shows an exact correspondence to psychological theory. Except in the case of *traumatic* events, there is systematically better recall for more salient than less salient events.

Household Expenditures. In a validated recall study of household purchases, Sudman and Ferber [1970] found that the recall rates for purchases of furniture and major appliances exceeded the recall rates either for purchases of housewares and small appliances or for purchases of auto supplies and services. Neter and Waksberg [1964], in a study on response errors in the reporting of alterations and household repairs conducted for the Census Bureau, found that as the period of recall was lengthened from one month to three months, respondents reported substantially fewer small jobs (under \$50) but almost the same number of large jobs (over \$50).¹⁵

13. Murphy and Cowen found no significant relationship between telescoping and salience in the National Crime Survey.

14. *Bounded* recall is a method developed for follow-up surveys in which the respondent is first asked about the occurrence of an event and then, in subsequent interviews, is asked about all purchases *after* those mentioned in the first interview. This method is used to eliminate *telescoping*. The WES questionnaire is not strictly speaking a *bounded* recall survey, but the wording of its questions borrows something from this technique, and thereby attempt is made to reduce telescoping. In the WES, the interviewer subtracts from 52 the number of weeks that Doty worked in the previous calendar year; he then asks how many of those *remaining* weeks was Doty searching for work.

15. Sudman and Bradburn [1973] note that this difference could also be due to a type of "aided recall" in large alterations because the presence in the household of the alteration acts as a reminder of it.

Morbidity. In general, serious sickness is remembered more than nonserious illness. In the British Survey of Sickness, the rate of forgetfulness of "serious illness" is less than that of "influenza" or "colds" [Gray, 1955]. In a study of chronic diseases as reported by interview relative to medical records, William Madow [1967, p. 20] finds:

When respondents are classified by whether some chronic condition has had an impact on them—such as causing them to limit food or drink, or to take medicine, or to have pain or discomfort, or to worry or to be limited in their activities because of health—the differences in reporting the conditions are large, especially when more than one of these "impact" characteristics are present.

It therefore should be no surprise that hospitalization tends to be less underreported the longer the stay. This is a systematic finding across all age groups and appears in two studies [Cannell, Fisher, and Bakker, 1965; Belloc, 1954]. It is a bit of a surprise, however, that hospitalization where the diagnosis is "threatening" to the patient is uniformly more underreported than when the diagnosis is not threatening. See Cannell, Fisher, and Bakker, [1965]; Cannell and Fowler, [1965]. An explanation consistent with psychological theory is that memories of such traumatic events are repressed. This same explanation was offered for high rates of forgetfulness of serious diseases in a comparison of pediatric histories relative to medical records, in which "the mothers tended to forget the severe illnesses as much if not more than the less severe ones" [McGraw and Molloy, 1941, p. 257].

Respondent Biases. Continuing with disease, it turns out that respondents tend to remember more of their *own* diseases than those of other household members [Cartwright, 1957]. This finding is consistent with the hypothesis that most diseases will be more salient for the person involved than for other household members. However, in the case of *major illnesses*, in which the disease has a high level of salience for all household members, such respondent differences are not found [Allen et al., 1954; Enterline and Capt, 1959].

Sex Differences in Response. A study by Ferber [1955] showed that men tend to remember purchases of cars, tires and tubes, and building materials better than women, whereas women tend to have a better memory for purchases of household furnishings, appliances, and clothing. Similar sex differences are recorded in memory tests of advertisements [Barkley, 1932]. Women and men

each seem to have greater memory for the type of purchases for which they tend to be personally responsible.

Wages. In a validated study of recalled versus actual wage changes, Hardin and Hershey [1960] find greater recall of large wage changes than of small wage changes. In one survey this difference was quite large, although the authors seem disappointed at its "bare significance." In a second survey the same effect could be seen, although it was not statistically significant.

Voting Behavior. In a study of Denver voting patterns from 1950, Cahalan [1968–1969] found greater correct recall by voters about whether or not they voted in the 1944 presidential election than in the 1946 Congressional election despite the passage of two more years' time since the Presidential election.

Crime Survey. In experiments designed to evaluate the effect of reference period length on reported victimization rates in the National Crime Survey, it was found [Bushery, 1981] that lengthening the reference period from six to twelve months led to a significant decrease in reported rates of personal theft, burglary, and household larceny, but had an insignificant effect on the reported rates of violent crimes and auto thefts, which are presumably more serious. Surprisingly, however, the victimization rates reported in three-month reference periods were at significantly higher levels than in six-month reference periods for all crimes except burglary and auto theft. This finding may reflect the fact that violent crimes and auto thefts, which are presumably most serious, are subject to offsetting effects: they are more likely to be remembered because of their seriousness, but their memory is also more likely to be repressed because they are on average more traumatic.

In summary, these sixteen studies yield a surprisingly consistent picture. Except in the case of truly traumatic events, greater memory is associated with greater salience. Thus, if unemployment experience can be likened to *chronic disease* (as in the study by Madow) rather than to *life threatening disease* (as in the study by Cannell et al.), then more salient (and presumably therefore also more painful) experiences of unemployment will be associated with greater recall. It turns out that there is reason to believe that unemployment is of the former rather than of the latter type because of the behavior of our data. Cross-section and time series differences in the u_{WES}/u_{CPS} ratios are consistent with such a hypothesis; we can point out two explanations for the cross-section differences that are alternative to the salience hypothesis; but

alternative explanations for the time series results are harder to find.

3. Cross-Section Findings

Table III reports the relative values of the u_{WES}/u_{CPS} ratio for six age-sex subgroups of the population. For the four subgroups of males/females 16 to 24 and 25 to 55, the relative u_{WES}/u_{CPS} ratios exactly correspond to relative financial burden. Young have lower u_{WES}/u_{CPS} ratios than old. Women have lower u_{WES}/u_{CPS} ratios than men. In regard to the differences between men and women, men are more commonly considered responsible than women for earning outside income—a social expectation that is mirrored in the small proportion of women classified as heads of household or the small number of men who are not in the labor force because of housekeeping activities.

A puzzle remains, however. Old men and old women both have high u_{WES}/u_{CPS} ratios. There are two possible interpretations of this fact—neither of which is inconsistent with the interpretation of the u_{WES}/u_{CPS} ratio as a measure of pain. In the first place, older persons are poorer than the rest of the population, and therefore their unemployment may be associated with greater loss of utility. Second, as already mentioned, the psychology of time suggests that time durations may be underestimated in direct relation to the busyness of the individual involved. Older persons, in a stage of the life cycle with fewer family responsi-

TABLE III
AVERAGE VALUES OF u_{WES}/u_{CPS} FOR SIX AGE-SEX SUBGROUPS OF THE POPULATION,
1960–1981

Group	Average value of U_{WES}/U_{CPS} , 1960–1981
Both sexes, 16 years and over ^a	0.896
Men, 16 years and over ^a	0.983
Men, 16–24 years ^a	0.780
Men, 25–54 years	1.151
Men, 55 and over	1.161
Women, 16 years and over ^a	0.790
Women, 16–24 years ^a	0.614
Women, 25–54 years	0.889
Women, 55 years and over	1.186

a. This group includes 14 and 15 year olds prior to 1965.

bilities than prime age persons, may be less busy. Therefore, they may overreport their time. The same hypothesis of relative busy-ness also explains the prime-age/youth and male/female differentials. Youth can revert to training if unemployed. Many women revert to housekeeping activities when unemployed, whereas men, except in rare instances, deny this role as their major activity. Thus, for both the older groups and the younger groups below 55, the "relative busy-ness hypothesis" exactly explains the u_{WES}/u_{CPS} ratios. This explanation is consistent with our basic hypothesis that the u_{WES}/u_{CPS} ratio measures the painfulness of unemployment. One of the two major sources of such pain is due to financial loss; the other is that time weighs heavily on the unemployed. This burden of idleness can be assumed to be in inverse relation with the busy-ness of the individual in question.

It must be pointed out, however, that *respondent* bias may also explain the cross-section differences in the u_{WES}/u_{CPS} ratios. Both the WES and the CPS involve interview of a single member of a household to enumerate the experience of all other members. The search experience of young persons may tend to be better remembered *currently* on the CPS than on the WES, two to fourteen months later by other family members only because the respondents forget more quickly the search experience of their children than of themselves or of other prime age household members. Furthermore, the number of teenage unemployed has a peak in the summer and a low in March, at the time of the survey. As a result, even if teenagers report their own work experience, but there is forgetfulness with the passage of time, this seasonal pattern would cause greater teenage underreporting than for other segments of the population for whom the seasonal pattern is less pronounced.

Because of the ambiguity imparted to the interpretation of these cross-section statistics by both the respondent and seasonal effects, much greater reliance should be placed on the consistency of the cyclical behavior of the u_{WES}/u_{CPS} ratio with our hypothesis that this ratio is a measure of pain than on the consistency of the cross-section differences with our hypothesis. The cyclic behavior of u_{WES}/u_{CPS} will now be described.

4. Time Series Results

A second, and far less ambiguous, indicator that the u_{WES}/u_{CPS} ratio varies systematically with the painfulness of unemployment comes from the cyclical behavior of this ratio. In reces-

sions jobs are harder to find, and unemployment lasts longer. Assuming that unemployment is indeed more painful on average in recessions, one would expect the u_{WES}/u_{CPS} ratio to rise as the unemployment rate increases. Regressions (1) and (2) show that in the aggregate, the elasticity of u_{CPS} with respect to u_{WES} is significantly less than one as expected. Table V, discussed in greater detail below, shows that the identical cyclic behavior is found when unemployment is disaggregated by demographic group. This table shows regressions analogous to the aggregate regressions (1) and (2) for six age-sex subgroups. For each of these groups, with the exception of prime age men, as u_{WES} rises, u_{CPS} rises by less. Thus, in recessions the u_{WES}/u_{CPS} ratio rises. For prime age men, recall of search activity is extremely accurate, and there is an almost one-to-one relation between u_{WES} and u_{CPS} .

Roughly, these cross-section, time-series results agree with another index of the seriousness of unemployment. A short disaggregated series exists (see Table IV) on the number of search methods used by job seekers. For younger and prime age males and females, there is a perfect correlation between the u_{WES}/u_{CPS} ratio and the average number of job search methods used. Older males and females, however, typically use fewer search methods, which may reflect their relative lack of opportunity rather than their relative lack of interest in employment. Comparison of the average number of job search methods used for the high unemployment years 1975 and 1976 in comparison to the low unemployment years 1978 and 1979 show that the number of job search methods used increases with the average rate of unem-

TABLE IV

AVERAGE NUMBER OF JOB SEARCH METHODS USED BY UNEMPLOYED JOB SEEKERS FOR SIX AGE-SEX SUBGROUPS OF THE POPULATION, 1974-1979

Year	Men			Women		
	16-24	25-54	55 and older	16-24	25-54	55 and older
1974	1.54	1.73	1.51	1.47	1.47	1.53
1975	1.57	1.75	1.55	1.48	1.53	1.49
1976	1.57	1.75	1.55	1.50	1.53	1.51
1977	1.57	1.72	1.54	1.48	1.54	1.51
1978	1.52	1.69	1.45	1.46	1.52	1.48
1979	1.52	1.71	1.50	1.47	1.52	1.47

Source. *Employment and Training Report of the President*, 1980, Table A-29, pp. 263-64.

ployment. This corresponds to the observed increase in u_{WES}/u_{CPS} as unemployment rises.

IV. CHANGE IN AGGREGATE u_{CPS} RELATIVE TO u_{WES} DUE TO CHANGING LABOR FORCE COMPOSITION

Regressions (1) and (2) clearly reveal a secular decrease of u_{WES} relative to u_{CPS} . Part of this decrease can be attributed to changes in labor force composition. Those demographic groups with a high tendency to understate their unemployment weeks in the WES relative to those currently reported in the CPS have been increasing as a fraction of the labor force.

An estimate can be made of the size of this effect. Suppose that the unemployment rates for each group, and also the u_{WES}/u_{CPS} ratios for each group, had remained constant at their average levels for the 1960 to 1981 period. The changes in labor force shares of the six demographic groups which occurred between 1960 and 1981 would have boosted the aggregate u_{CPS}/u_{WES} ratio by 5.7 percent. This is 28.2 percent of the 20.2 percent change predicted to occur over a 21-year period by regression (1).¹⁶

A bit of algebra shows how this calculation is made. Following Morgenstern and Barrett, call $pdif$ the proportion of u_{CPS} which is not reported in the Work Experience Survey, so that by definition $u_{WES}(1 + pdif) = u_{CPS}$. Let subscript j index the six age-sex groups, and subscript A refer to aggregate.

The aggregate CPS rate is then

$$(3) \quad u_{CPS,A} = \sum_{j=1}^6 lf_j u_{CPS,j}$$

where lf_j is the proportion of the civilian labor force in group j . Similarly, the aggregate WES unemployment rate is

$$(4) \quad u_{WES,A} = \sum_{j=1}^6 lf_j u_{WES,j}$$

The ratio of the aggregates is

$$(5) \quad \frac{u_{CPS,A}}{u_{WES,A}} = (1 + pdif_A) = \frac{\sum_{j=1}^6 lf_j u_{CPS,j}}{\sum_{j=1}^6 lf_j u_{WES,j}}$$

16. $0.202 \approx e^{21 \times .0088} - 1$. 0.0088 is the coefficient of time in regression (1).

$$(6) \quad 1 + pdif_A = \frac{\sum_{j=1}^6 lf_j (1 + pdif_j) u_{WES,j}}{\sum_{j=1}^6 lf_j u_{WES,j}}$$

The number 0.057 is calculated by subtracting the right-hand side of (6) calculated with the labor force proportions of 1960 (and the average 1960 to 1981 levels of $pdif_j$ and $u_{WES,j}$) from the right-hand side of (6) calculated with the labor force proportions of 1981 (and the same average $pdif_j$'s and $u_{WES,j}$'s).

In a precise sense this calculation shows how much of the change in u_{CPS} relative to u_{WES} has been due to the changes in the relative sizes of the labor force groups. Having made this calculation, it remains to examine the extent to which the $pdif$ for each individual group has changed over time.

V. CHANGES IN u_{CPS} RELATIVE TO u_{WES} FOR DEMOGRAPHIC SUBGROUPS

Table V reports regressions analogous to regression (1) for each of the six age-sex demographic groups: the natural logarithm of u_{CPS} is regressed on the natural logarithm of u_{WES} for the corresponding group and time. Table VI reports regressions analogous to (2) for the six demographic groups. These regressions include a dummy variable to correct for the changes introduced in the CPS survey by the Gordon Commission in 1967. This table also reports the results of running regression (1) on post-1967 data only. There is evidence of significant secular change for several of the demographic groups. For younger and older persons, u_{CPS} appears to have increased relative to u_{WES} , although the time coefficient for older men is below the level of statistical significance. However, for prime age men, and for prime age women after adjustment for the 1967 changes in the CPS definition of unemployment, there appears to be no trend rate of change of u_{CPS} for given levels of u_{WES} .

The Young and the Old. The time coefficients for young men and women and for older women are positive and significant at the 95 percent level, while the time coefficient for older men is positive but insignificant. This suggests that, for younger and older people, unemployment is becoming less memorable. There are logical reasons for this. In the case of 16-to-24 year olds, there is an increasing fraction in school. Between 1960 and 1980 the ratio of persons in secondary and higher education to the popu-

TABLE V
EQUATIONS RELATING u_{CPS} TO u_{WES} AND TIME FOR SIX AGE-SEX SUBGROUPS OF THE POPULATION, 1960-1981^a

Equation	Group	Independent variable			Summary statistic		
		Constant	$\log(U_{WES,i})$	Time	Standard error of estimate	Durbin-Watson	\bar{R}^2
(5-1)	Men, 16-24 ^b	0.8702 (0.0746)	0.6809 (0.0357)	0.0071 (0.0016)	0.0462	2.51	0.96
(5-2)	Men, 25-54	-0.1215 (0.0459)	0.9788 (0.337)	0.001 (0.001)	0.0555	2.53	0.98
(5-3)	Men, 55 and over	0.0357 (0.0902)	0.8467 (0.0560)	0.0025 (0.0027)	0.0779	2.20	0.92
(5-4)	Women, 16-24 ^b	1.3791 (0.0764)	0.5246 (0.0411)	0.0050 (0.0014)	0.0382	1.67	0.93
(5-5)	Women, 25-54	0.4971 (0.0576)	0.6984 (0.0386)	0.0072 (0.0016)	0.0475	2.18	0.95
(5-6)	Women, 55 and over	-0.1384 (0.1220)	0.8444 (0.0794)	0.0180 (0.0031)	0.0893	1.79	0.85

a. The dependent variable is $\log(u_{CPS,i})$, where i denotes a particular age-sex subgroup of the population. Numbers in parentheses are standard errors.
b. For years prior to 1965 this group includes 14 and 15 year olds.

lation aged 14 to 24 grew 23 percent from 0.468 to 0.577.¹⁷ Concerning older people, there have been large changes in eligibility for disability insurance.¹⁸ It is logical to suppose that there exists some interaction between disability benefits and unemployment. Those on the margin of being disabled find it difficult both to retain a job and also to find employment. Disability insurance not only may make *unemployment* less urgent financially, but also *employment* may be associated with termination of benefits. The interpretation that the unemployment burden for older people has been eased by expanded disability insurance, as is consistent with these regression results, is a possible indicator of the benefits from the increased expenditures on disability insurance.

Prime Age Men and Women. For prime age men and also for prime age women, we conclude that there is no trend in u_{CPS} for given levels of u_{WES} . For prime age men the estimated time coefficients in regressions (5-2), (6-3), and (6-4) in Tables V and VI are negligible in size and insignificant. Furthermore, the coefficient of u_{WES} is not significantly different from one. This suggests that unemployment spells of prime age men are extremely salient events which are always accurately remembered.

The conclusion of absence of trend for prime age women requires explanation. Such a trend does appear to be present in regression (5-5), with a coefficient on time which is both large, 0.72 percent per year, and statistically significant. However, when a post-67 dummy is added (equation (6-9)) this coefficient is halved in size, and neither time nor the dummy is significant. Insignificance of a time trend does not mean, however, that it is absent. In regression (5-5) with time alone, the time coefficient is significant; in regression (6-10), without time, the coefficient of the post-67 dummy is significant. With both time and a post-67 dummy variable, however (equation (6-9)), there is sufficient multicollinearity that neither coefficient is significant. However, if the regression is restricted to post-1967 data (equation (6-11)), the coefficient on time drops to almost zero with very low significance. This strongly suggests that the shifts in u_{CPS} as a function of u_{WES} over time have been due to the revision in the CPS questionnaire

17. Computation made using data from *Statistical Abstracts of the United States, 1981*, Table 30, p. 27 and Table 216, p. 134.

18. From 1968 to 1978 the number of primary beneficiaries receiving disability insurance increased from 1.2 million to 2.9 million [Van de Water, 1979]. This increase of 1.7 million in the number of recipients of disability insurance far exceeds the number of older workers unemployed; in 1978 the average number of workers 55 and over who were unemployed according to the CPS was 461,000.

TABLE VI
EQUATIONS RELATING u_{CPS} TO u_{WES} , TIME AND $DUM67$ FOR SIX AGE-SEX SUBGROUPS OF THE POPULATION^a

Equation	Group	Independent variable					Summary statistic			
		Constant	$\log(U_{WES,i})$	Time	$DUM67$	Rho	Interval	Standard error of estimate	Durbin-Watson	\bar{R}^2
(6-1)	Men, 16-24 ^b	0.9154 (0.0525)	0.6622 (0.0253)	0.0102 (0.0020)	-0.0527 (0.0252)	-0.4875 (0.2123)	1960-1981	0.0411	1.77	0.97
(6-2)	Men, 16-24 ^b	0.7841 (0.0526)	0.7222 (0.0317)	0.0065 (0.0022)	—	—	1967-1981	0.0262	2.39	0.99
(6-3)	Men, 25-54	-0.1051 (0.0544)	0.9664 (0.0402)	0.0030 (0.0039)	-0.0304 (0.0514)	—	1960-1981	0.056	2.57	0.98
(6-4)	Men, 25-54	-0.1463 (0.0489)	1.0105 (0.0612)	-0.0003 (0.0055)	—	—	1967-1981	0.052	2.44	0.98
(6-5)	Men, 55 and over	0.0764 (0.1076)	0.8216 (0.0667)	0.0051 (0.0047)	-0.0516 (0.0720)	—	1960-1981	0.079	2.25	0.92

(6-6)	Men, 55 and over	0.0219 (0.1022)	0.8210 (0.0952)	0.0054 (0.0057)	—	—	1967-1981	0.080	1.99	0.89
(6-7)	Women, 16-24 ^b	1.4186 (0.0778)	0.5044 (0.0417)	0.0081 (0.0024)	-0.0472 (0.0301)	—	1960-1981	0.037	1.96	0.93
(6-8)	Women, 16-24 ^b	1.3042 (0.0775)	0.5576 (0.0487)	0.0053 (0.0026)	—	—	1967-1981	0.032	1.39	0.96
(6-9)	Women, 25-54	0.4524 (0.0644)	0.7278 (0.0429)	0.0035 (0.0030)	0.0582 (0.0411)	—	1960-1981	0.046	1.98	0.95
(6-10)	Women, 25-54	0.4249 (0.0601)	0.7524 (0.0373)	—	0.0981 (0.0215)	—	1960-1981	0.047	1.66	0.95
(6-11)	Women, 25-54	0.4880 (0.0601)	0.7648 (0.0596)	0.0012 (0.0039)	—	—	1967-1981	0.043	1.06	0.95
(6-12)	Women, 55 and over	-0.1940 (0.1399)	0.8796 (0.0906)	0.0145 (0.0053)	0.0657 (0.0790)	—	1960-1981	0.090	1.76	0.85
(6-13)	Women, 55 and over	-0.0943 (0.1393)	0.8197 (0.1163)	0.0175 (0.0062)	—	—	1967-1981	0.094	1.55	0.86

a. The dependent variable is $\log(u_{CFRS}^i)$, where i denotes a particular age-sex subgroup of the population. Numbers in parentheses are standard errors.
 b. For years prior to 1965 this group includes 14 and 15 year olds.

in 1967 rather than to time trends in the painfulness of unemployment. Independent evidence also corroborates this hypothesis.

In the year prior to the introduction of the 1967 CPS questionnaire revisions, the Census ran two parallel surveys, using both the new and old questionnaires. In general, there is a good correspondence between the signs of the coefficients of the post-67 dummies in Table VI and the percentage differences in unemployment rates caused by the introduction of the new CPS procedures.¹⁹ In particular, the new interview procedures resulted in a very significant increase in the unemployment rates of prime age women relative to prime age men [Stein, 1967].²⁰

VI. SUMMARY AND CONCLUSION

This paper has constructed an annual unemployment series u_{WES} , based on respondents' recollection of unemployment over the prior two to fourteen months. Over the past two decades, this unemployment series has declined secularly relative to the official unemployment series u_{CPS} . Approximately 30 percent of the relative decrease in u_{WES} as a function of u_{CPS} is due to a change in the composition of the labor force, being increasingly weighted with groups whose reported u_{WES}/u_{CPS} ratios are low. For younger and older people (although not statistically significant for older males)

19. In all cases except one there is agreement between the sign of the predicted changes from the matching study and the coefficient of the post-67 dummy. In the single case where there is a difference in sign, the prediction of the matching study is 1.2 standard errors from the coefficient of $DUM67$.

20. The unemployment rates under the new and the old procedures are almost the same both for the whole population (16 and over) and also for every age group, aggregating both men and women. However, the unemployment rates for men and women in different age subgroups are quite different. For prime age women the new procedure had a rate of unemployment 0.5 percent higher. Prime age men, however, had an unemployment rate 0.4 percent lower with the new procedures than with the old. Lest it be thought that these changes are small, it must also be noticed that the unemployment rates for both men and women were so low that in *percentage* terms these differences are quite large. The combined effect on the male-female prime age differential is 0.9 percent. This is 35 percent of the prime-age combined male-female unemployment rate of 2.6 percent. On a comparable basis this same percentage shift would make a difference of about 3.0 percent today in the prime age male-female differential. This suggests that a significant part of the shift in the official unemployment rates of women relative to men is in fact due to these same shifts in definition. This explanation is consistent with the results of Gordon's [1980] *adjusted* unemployment rates that show little long-run change in the male-female differential.

One more caveat needs to be added. The month of the WES was changed from February to March in 1969. Conceivably $DUM67$ is picking up this change rather than (or perhaps in addition to) the 1967 change in definition. On average, February has 10 percent more unemployment for men and 8 percent more unemployment for women than March, so this change in month, in addition to elongating the reference period and reducing recall in general, could also cause systematic changes in the relative unemployment rates of different subgroups.

u_{CPS} has risen for given u_{WES} over the longer run. For prime age males and for prime age females (in the latter case only after adjustment for the changes in the questionnaire in 1967) there has been virtually no change in u_{CPS} as a function of u_{WES} .

The preceding description of the facts can be coupled with an interpretation of the data that is consistent with both psychological theory and previous studies of recall bias. According to this theory, more salient events, unless traumatic, are more exaggerated in memory. Thus, the ratio u_{WES}/u_{CPS} serves as an index of unemployment salience, or alternatively stated, of the psychological painfulness of unemployment. According to this view, unemployment has increasingly been concentrated in groups for whom the salience of unemployment is low. In addition, the salience of unemployment for younger persons and older persons has decreased over time. There are obvious possible reasons (increased school attendance, greater ease of obtaining disability benefits) that could explain these phenomena. However, no change in the salience or painfulness of unemployment for prime age men and women, as measured by shifts in the u_{CPS}/u_{WES} function, could be discerned from our data.

In a sense that was described in Section II, "unemployment through the memory filter" lies in February, 1984, at 6.7 percent (with a CPS rate of 8.1 percent) adjusted to the point of view of 1960. Thus, unemployment adjusted for pain has not risen as much as the official u_{CPS} . However, 6.7 percent in 1960 would have been considered an extremely high unemployment rate—indeed the second highest annual rate of the postwar period up to that time. Thus, while there seems to be some decrease in the painfulness of unemployment, this decrease is not so great as to trivialize in any way the concern with current high rates of unemployment. And for prime age men and prime age women, there is no indication of decreases in painfulness.

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