Correspondence received in relation to Linsker R, Garwin RL, Chernoff H, Horowitz P and Ramsey NF. Synchronization of the acoustic evidence in the assassination of President Kennedy. Science & Justice 45: 207-226. 2005.

Madam,

The article by Linsker et al, recently published in Science & Justice [1], asserts that the sounds on a Dallas police recording determined on acoustical criteria [2,3] to be the gunshots that killed President Kennedy, cannot be the assassination gunfire because they were not recorded simultaneous with the shooting. The position taken by Linsker et al however, relies more on assumptions than on data, and makes errors of omission which in this observer's opinion, are fatal to their argument.

On the day that President Kennedy was assassinated, Dallas Police officers were communicating over two radio channels, both of which were recorded. The primary channel, designated as channel one (hereinafter Ch-1), contains the suspect noises that have been identified as the assassination gunfire. An auxiliary channel, designated as channel two (hereinafter Ch-2), was used for transmissions by the police escort of the presidential motorcade and contains broadcasts which by their context, establishes the time of the shooting. Synchronization of events between the two channels is possible because of time notations by the dispatchers and by crosstalk (accidental simulcasts) between the channels. The timeline favored by Linsker et al is based on a crosstalk of the words "HOLD everything secure." The utterance occurs on Ch-2 approx 60 sec after the first broadcast transmission indicating that the President had been shot, an order by the Chief of Police to "GO to the Hospital." On Ch-1, the HOLD utterance is essentially simultaneous with the suspect sound identified as the last in an 8.3 sec sequence of putative gunfire. Logic dictates, and Linsker et al conclude, that the sounds identified as gunshots must therefore have been recorded at least 60 sec after the assassination. But the validity of that conclusion rests on the reliability of the apparent juxtaposition of the crosstalks to other events on the channels for establishing synchrony or lack thereof. Their first error of omission was a failure to include the data shown here in Table 1 which provides the time intervals between the crosstalks on the two channels. Five instances of crosstalk have been identified in the six minute interval surrounding the assassination, and in every instance the interval (playback time) between the crosstalks is different. Because of these time offsets the apparent juxtaposition of events is clearly not entirely reliable for establishing synchrony of events on the two channels. Several phenomena, including recorder stoppage, incorrect playback speed, and stylus displacements, are among the factors imposing time offsets on the recordings.

INTERVAL	CH-1	CH-2	
CHECK to HOLD	10	99	89
HOLD to YOU	174	143	31
YOU to ALL	15	12	3
YOU to ATTENTION	114	90	24

Table 1 Speed corrected playback time intervals between simulcasts on the Dallas Police recordings (in seconds). Data from O'Dell [4]

Linsker et al. acknowledge only two of the five crosstalks and take the position that the offsets can be attributed to recorder stoppage on Ch-2. This assumption may be consistent with their conclusions but is not supported by direct evidence of recorder stoppage, and is not in good accord with the recorded time notations. The dispatcher's time notations provide an appropriate data set for testing among alternative timelines because it is strongly dependent on the passage of real time and completely independent of the juxtaposition between events such as the putative gunshots and the assassination itself. The dispatcher's time notations were not meant as precise clock markers, but rather were appended to the dispatcher's broadcasts as a part of radio protocol. Hence, the frequency and spacing of the notations is dependent on the frequency and spacing of the dispatcher's broadcasts. But because the respective notations must fall within sequential 60 sec bins, they will tend to plot on a straight line with a slope of one if there is close correspondence between real time and recorded time. Table 2 provides a regression analysis of the dispatcher time notations against the Linsker et al timeline based on the assumption of recorder stoppage on Ch-2 and an alternative timeline based on the counter assumption that there are offsets on both channels. When the timeline is corrected to account for these offsets using Linsker et als assumption about recorder stoppage on Ch-2 the result is a comparatively poor fit to the radio dispatcher's time notations.

The Linsker et al timeline is derived from the intervals between observed dispatcher time notations with the two time offsets (31 & 24 sec) added to the appropriate intervals. The corrected timeline assumes that the 31 sec offset was caused by an imposition on Ch-1 and thus is not factored into the Ch-2 timeline. Because it assumes offsets on Ch-1, the corrected timeline is compatible with the suspect sounds being synchronous with the time of the assassination. It also happens to have the best fit with the dispatcher's time notations, a nearly perfect slope of 0.99, as opposed to a slope of 1.07 for the Linsker et al timeline (both values fall within two s.d. of slope = 1.0). This analysis was part of the information that I

DISPATCHER NOTATIONS	EXPECTED TIMELINE	OBSERVED TIMELINE	CORRECTED TIMELINE	LINSKER ET AL TIMELINE
12:30	0	0	0	0
12:31	60	94	94	94
12:32	120	121	121	152
12:34	240	213	213	244
12:35a	300	269	293	324
12:35b	300	300	324	355
12:36a	360	330	354	385
12:36b	360	362	386	417
SLOPE		.91	.99	1.07

Table 2 Least squares regression of time intervals among dispatcher's notations against expected time with and without corrections for the offsets (?) noted in Table 1 and as discussed in the text. All times in speed corrected playback in seconds. Data from O'Dell [4]. Correlation Coefficient (r) = 0.99 for all three regressions.

provided to Linsker et al in a personal communication and which they cite as an error of reasoning on my part. Linsker et al state (p. 224), "To favor one time calibration over another, the investigator must show that one regression analysis is better than the other to a statistically significant extent, and this was not done." That is exactly correct, and that is exactly what they failed to do. As the promulgators of the assertion that their timeline demonstrates a lack of synchrony between the putative gunshots and the assassination, a result which would be incongruent with the acoustical evidence, the burden of proof is on them to show that their timeline is superior to the alternatives, and that the difference is statistically significant. Without providing the underlying data, Linsker et al claim a slope of 1.03 for their timeline. But it is evident that they do not include the 24 sec offset between the YOU and ATTENTION crosstalks. Moreover, their comparison timeline was not the proper one, but rather one that assumed "no dead time." But the synchronization of the gunshots and the assassination do not require such an assumption. Various timelines are compatible with the acoustical evidence, including some dead time on Ch-2, as long as they allow for offsets on Ch-1.

The more serious error in Linsker et al's analysis involves their treatment of the crosstalk closest to the time of the assassination. In spite of their argument that the putative gunshots are not synchronous with the assassination, Linsker et al failed to establish the time of the assassination on Ch-2. The time of the assassination can be fixed by the context of two broadcasts. One is the aforementioned order to "Go to the hospital." Twenty seconds earlier Chief Curry, in the lead car, had announced his position with the words, "approaching the triple underpass." The triple underpass is a railroad bridge at the west end of Dealey Plaza. Photographs of the motorcade in Dealey Plaza [5] show that the lead car was approx. 40-50 m in advance of the presidential limousine. With the lead car at or near the underpass the limousine would have been in the mid-section of Elm Street where the shooting occurred. Hence, the broadcast by Curry that he was at the triple underpass must occur within moments of the shooting and serves as a marker for the time of the assassination. The crosstalk event closest to the Underpass broadcast on Ch-2 occurs just two seconds earlier wherein the Deputy Chief of Police utters the words "Naw that's all right, I'll check it." The latter words, "I'll check it" also occur on Ch-1 just two seconds before the first acoustically identified gunshot sound. By failing to fix the time of the assassination Linsker et al avoided having to explain the apparently diabolical coincidence established by this crosstalk. Using this crosstalk to synchronize events places the alleged gunshot sounds precisely simultaneous with the time of the assassination. Because the "I'll check it" transmission is only two seconds before the broadcast marking the time of the assassination, the interval between them is much less likely to be subject to an imposition of the phenomena causing the time offsets, as opposed to the crosstalks that occur more than a minute later.

Without explaining its significance, Linsker et al challenged the validity of the CHECK broadcast as a true crosstalk. In so doing Linsker et al also failed to provide the reader with the information that the "I'll check it" broadcast was first recognized as crosstalk by the Dallas Police officers who prepared the official transcripts, preferring to attribute the assertion to me "and others," and cited by them as an error by me. In point of fact, the officer in charge of the police communications department in 1963, JC Bowles, not only identified the transmission as crosstalk, but cites it as the exemplar of the crosstalk phenomenon [6]. Linsker et al take the position that the utterance on Ch-1 is not a crosstalk from the Fisher broadcast on Ch-2, but, their stated reason (p. 221) for this conclusion is that, "if CHECK were a valid crosstalk its timing would be incompatible not only with HOLD, but also with the timing of the well established crosstalk YOU…" Of course, the incompatibility exists only if their unsupported assumption concerning the recorder stoppage happened to be true. Because there are offsets between all of the crosstalks, any crosstalk is incompatible with all other crosstalks!

Linsker et al applied a computer driven comparison called "pattern cross correlation" to compare the frequency patterns in three of the purported crosstalk pairs. In all three instances the computer generated a peak indicating a significant degree of spectrographic similarity between the crosstalk pairs, including the CHECK pair. This fact was not obvious in the Linsker et al report because they provide the correlation coefficients (respectively 0.38 and 0.32), and a graph of the peaks, for the YOU and HOLD crosstalks, but withhold the results for the CHECK comparison. The result for the CHECK pairs is revealed only in a statement (p. 221) that the peak obtained was about the same amplitude as (no larger than) some "accidental peaks." But a graph (their fig. 9) demonstrating these accidental peaks show some of them to be of the same amplitude achieved for the other crosstalks, in the range of 0.3 against a background of 0.1. Evidently, Linsker et al believe that the peak generated by the PCC comparison must be a false positive, or "accidental," but such explicit opinion was withheld along with the graph of the

peak and the correlation coefficient value. In dismissing the PCC results, Linsker et al argue (p. 222) that the peak so obtained was not at the "expected" speed warp. But in this context the "expected" speed warp is meaningless. The "expected" speed warp is extrapolated from the 60 Hz AC hum (p. 211). But it is known that the instantaneous speed of the recording mechanism wobbles around the motor speed. It is precisely for this reason that the PCC comparison is performed iteratively at increments of deviation from the expected speed. In a classic example of circular reasoning, Linsker et al defined the "correct" speed as that which produces the strongest PCC peak (p. 211)! This reasoning was applied to the crosstalk instances favored by them, but not to the CHECK crosstalk. Linsker et al state correctly (p. 212) that "The PCC peak is diminished if one of the channels is sampled at the wrong rate (speed)." But conversely, sampling at the wrong rate cannot of itself produce a peak, or false positive, which may be why that argument is not explicitly stated by Linsker et al, and only implied.

The PCC comparison of the crosstalks is not of itself definitive. The relatively low correlation coefficients are only indicative of significant similarity and not identity. A high correlation is not expected even if the signals were identical. It is presumed that the lack of identity (PCC = 1.0) is due to the large amount of noise in the background, which is different on the two channels. But also, as Linsker et al. suggest (p. 222), it is possible that someone else with a similar voice pattern might have coincidentally spoke the same words, "I'll check it," on Ch-1. If so, it could certainly generate a false positive with the PCC test. Relevantly, Linsker et al cite a method to test for false positives. There should be an inverse relationship between the maximum PCC peak and the duration of the signal. By warping the duration of the signal there should be a concomitant diminution in the PCC peak if it is a true crosstalk. This test was applied to the two crosstalk instances favored by Linsker et al, but not to the CHECK crosstalk. Again, this failure was not obvious because of a statement on p. 222 of their report implying that the PCC peak had failed this test. In fact, the test had been applied only to the "accidental" peaks near the correct delay at the "expected" speed warp and not to the peak generated at the correct delay. Linsker et al should have applied the duration warp test to the peak obtained at the correct delay. As it stands, the CHECK crosstalk, identified as such by the Dallas Police, and now supported by the PCC test, indicates that the suspect sounds were deposited on the recording at the very instant that President Kennedy was shot.

Even if Linsker et al were correct and the CHECK crosstalk is just a diabolical coincidence, their timeline argument still fails because it is based on an assumption about the data, not on actual data. There is no direct evidence to favor any cause over another with regard to the demonstrable time offsets. Even if there were valid evidence contradictory to the core acoustical evidence the objective approach would be to attempt to resolve the contradiction, before one decides, as do Linsker et al, to arbitrarily accept one data set over another.

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References cited

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