

972 S.W.2d 713 (1998)

James R. GAMMILL and Deborah Dianne Gammill, individually, and a/n/f of Curtis Gammill, a minor, and Jaime Michelle Gammill, a minor, Petitioners,

v.

JACK WILLIAMS CHEVROLET, INC., and American Isuzu Motors, Inc., Respondents.

No. 97-0237.

Supreme Court of Texas.

Argued December 2, 1997.

Decided July 3, 1998.

715 *715 B. Thomas McElroy, Dallas, Patrick J. Fleming, Weatherford, for Petitioners.

James S. Maxwell, Betsy K. Power, Dallas, Donald Chrestman, Weatherford, Marlene S. Thomson, Dallas, for Respondents.

HECHT, Justice, delivered the opinion for a unanimous Court.

Whether summary judgment for defendants was proper in this products liability suit, as the court of appeals held it was,^[1] depends on whether plaintiffs' two expert witnesses (1) were qualified to give the opinions they gave, (2) demonstrated that their opinions were relevant and reliable, and (3) were denied a reasonable inspection of the subject vehicle. The lower courts answered each of these questions negatively. We affirm.

I

Deborah **Gammill** was driving her 1988 Isuzu Trooper about 40 m.p.h. on a two-lane county road at 4:35 p.m. with her three-year-old son Curtis in the right front seat and her ten-year-old daughter Jaime in the right rear seat when the vehicle went onto the right shoulder, swerved across the roadway onto the left shoulder, and continued along a grassy area until it struck a utility box and several trees. Deborah was severely injured and now remembers nothing about the accident. Jaime was also severely injured and died the next day. Curtis received minor injuries.

Deborah and her husband, James, sued the manufacturer and seller of their vehicle, American Isuzu Motors, **Inc.** and **Jack Williams Chevrolet, Inc.**, respectively, to recover damages for Deborah's injuries and Jaime's death. The Gammills pleaded products liability, misrepresentation, and negligence causes of action. While their factual allegations have shifted during the litigation, they now contend, in essence, that Deborah lost control of the vehicle because the accelerator pedal became caught in a wiring harness beneath the dashboard and would not release, and that Jaime died because her seat belt did not restrain her as it should have. The Gammills allege that the rear seat belt system and accelerator pedal were defectively designed and marketed, and that the vehicle was misrepresented as being safe.

More specifically, the Gammills allege that a wiring harness was positioned too close to the accelerator pedal and could block release of the pedal. As evidence of their contention, the Gammills point to a small scrape on the mylar sheath on the harness that they argue was made by rubbing against the pedal. With respect to the rear restraint system, the issues are complicated by the fact that no one saw whether Jaime was wearing her seat belt before the accident, and the fact that after the accident she was found lying on the floor of the vehicle between the front and rear seats. Thus, the first issue is whether Jaime was wearing her seat belt at the time of the accident. The Gammills contend that abrasions on Jaime's body and clothing, the nature of her injuries, and marks on the seat belt indicate that she was wearing it, as was her habit, when the accident occurred. The second issue is whether the seat belt was defective. The Gammills argue that the belt was made so that it did not fit tightly enough and that the push-button release was positioned so that it could be actuated

accidentally in a collision. The Gammills allege that an alternative design could have avoided these defects. Finally, the third issue is whether the alleged defects in the restraint system caused Jaime's death, or whether she would have died even if the system worked perfectly.

716 Two years after suit was filed, the Gammills delivered their vehicle to defendants for inspection by defendants' experts. After completing their inspection, defendants moved for summary judgment, supported by the affidavits of two engineers, one of whom was also a physician. The affidavits stated that: the wiring harness could not have blocked the accelerator pedal, and even if it could have, it could not have prevented application of the brakes in time to avoid the collision; Jaime was not wearing her seat belt at the time of the accident; the rear restraint system was not defective; and if *716 Jaime had been wearing her seat belt, her injuries would not have been fatal. The Gammills' attorney then withdrew, and the court extended the time for responding to defendants' motion to allow the Gammills to find new counsel. When counsel was substituted, the Gammills responded to defendants' motion, asserting that fact issues remained on all issues, based on the affidavits of two engineers, Robert Bell and William Rosenbluth. Both these experts had inspected the Gammills' vehicle, but the Gammills moved for a continuance to allow further inspection of the accelerator and wiring harness. The district court denied the motion for continuance and granted summary judgment, and the Gammills appealed.

The Gammills' second attorney then withdrew, and a third lawyer undertook their representation on appeal. The court of appeals reversed, holding that the Gammills had raised fact issues precluding summary judgment.^[2]

Six months after the case was remanded, the Gammills' third attorney withdrew and a fourth was substituted. Defendants again moved for summary judgment, based on the same evidence supporting their first motion, plus the affidavit of a third engineer. This time, however, defendants moved to strike the testimony of the experts designated by the Gammills on the ground that the experts were not qualified to give the opinions they gave, and on the further ground, following this Court's decision in *E.I. du Pont de Nemours & Co. v. Robinson*,^[3] that the experts' opinions were not reliable. The Gammills moved for further inspection of the vehicle, which they had requested defendants to store, including removal of the accelerator and rear restraint system from the vehicle for examination and testing.^[4] After numerous hearings regarding the Gammills' requests for further inspections of the vehicle, the court conducted an evidentiary hearing. At that hearing, the Gammills offered testimony by two of their experts, Ronald Huston and David Lowry. Defendants argued to the court that they should be disqualified from testifying and that their opinions were not reliable. The court did not rule immediately on either defendants' motion to strike the experts' testimony or the Gammills' motion to further inspect the vehicle. While those motions remained pending, the Gammills responded to defendants' motion for summary judgment, again asserting, based on Huston's and Lowry's affidavits and testimony at the hearing on the motion for inspection, that subsisting fact issues precluded summary judgment.

Huston, a licensed professional engineer with a bachelor's, master's, and doctoral degree in mechanical engineering from the University of Pennsylvania, has been a professor of mechanical engineering at the University of Cincinnati since 1962. He has conducted research in mechanics, dynamics, biomechanics, vehicle occupant kinematics, and vehicle occupant restraint systems. Huston has had occasion to examine and test many vehicle restraint systems. His tests on restraint systems have focused on retractor locking dynamics, buckle integrity, premature buckle release, and belt positioning on occupants. Huston has written over 100 journal articles, 125 conference papers, 45 technical reports, and two books summarizing the results of his research. Since 1975, he has worked as a consultant in litigation matters, testifying as an expert in over 325 depositions and more than 145 trials.

717 Huston has previously tested seat belts like those in the Gammills' vehicle, and at their instance, he inspected the rear seat belt in their vehicle that Jaime was alleged to have been wearing. Huston also reviewed accident photographs, the police report, Jaime's x-rays and medical records, her shirt, the depositions taken in the case, and defendants' experts' affidavits. Based on this information, Huston concluded in his affidavit that: Deborah "was wearing her seat belt, but this did not prevent her incapacitating *717 injuries from the impact and occupant compartment intrusion"; Jaime "received [a] fatal head injury from striking the right rear corner of the driver's seat back" where Huston found a dent, a tear in the seat cover material, and blood; Jaime "was wearing her seat belt at the beginning of the accident as evidenced by gliding abrasions found on her body, markings on the shirt she was wearing, apparent shirt fibers observed in the seat belt webbing, marks on the seat belt webbing, and the impact location on the driver's seat back"; Jaime's "seat belt

prematurely released during the impact of the accident"; "[a] properly fitting and secure lap and shoulder seat belt system (three-point system) would have prevented Jaime **Gammill's** fatal injuries"; "[t]he webbing loop at the buckle of the right rear seat belt allowed the webbing to flow through the loop in turn allowing looseness to occur in the webbing"; "the use of a side push button buckle release on the right rear seat belt and with the buckle positioned approximately 5 inches away from the seat bottom/back rest crease created a configuration ideally suited for premature release upon impact"; and "[t]he use of the webbing loop and buckle release ... were design defects allowing the fatal injuries of Jaime **Gammill** to occur."

David Lowry, a licensed professional engineer with a bachelor's and master's degree in mechanical engineering from Texas A & M University, is employed by Lockheed Martin Tactical Aircraft, where he is responsible for incorporating design details in the F-22 fighter plane's construction. He has previously worked on a high speed anti-radiation missile for Texas Instruments and on the F-111 fighter plane for General Dynamics. Lowry also owns his own consulting firm, Forensic & Analysis Consulting Technologies, **Inc.** While pursuing his master's degree, Lowry worked as an automobile mechanic, installing cruise controls, replacing rear ends and transmissions, and repairing brakes, water pumps, cylinder heads, engine mounts, electrical shorts, and universal joints. He has previously served as an expert in other automotive products liability cases.

Lowry inspected the vehicle three separate times and reviewed the police reports, Jaime's medical records, the autopsy report and photographs, and the affidavits of defendants' experts. Regarding the accelerator, Lowry's affidavit states that "the throttle return springs could have pulled the throttle pedal arm into the harness in such a way as to slightly buckle the mylar shroud and press the corner into the bundle of wires", thereby holding the pedal in place. Regarding the rear seat belt, Lowry's affidavit states the following in a paragraph headed "Theories":

Based on my inspections and the materials of the accident I have reviewed to date, my theory is that Jaime **Gammill** was wearing her seat belt at the time of the initial impact of the vehicle with fixed objects. I believe the seat belt served as a pivot about which Jaime rotated as her body was carried forward. She was released from the seat belt restraint and then struck the back of her mother's front seat. This movement is evidenced by a relatively low impact on the seat back approximately 10 inches above the height of the rear seat bottom. If she had not been belted, Jaime would have impacted the front windshield and possibly gone through it, or in any event would have struck the rear of the front seat backs much higher than markings of the seat show. Had the seat belt functioned properly, it would have been heavily loaded and it would have saved Jaime's life. The restraining force of the seat belt was equivalent to the force required to produce the dislocated hip, bruised pelvis, and bruised chest that Jaime incurred immediately prior to her head injuries resulting in her death. The seat belt caused injuries to the young girl, and was defective in that it failed to keep her restrained but released her to impact.

718 Before the summary judgment hearing, the district court disqualified two of the Gammills' experts as having been untimely designated but reserved ruling on whether Huston and Lowry should be disqualified. The court also allowed Huston and Lowry to inspect the vehicle further provided that they did not remove any part of it, and Huston and Lowry did inspect the vehicle. At the summary judgment hearing, the Gammills *718 continued to assert that their experts should be permitted to remove the shroud from the wiring harness to look for abrasions, to remove the clear plastic cover from the rear seat belt retractor, and to remove the entire rear seat belt assembly to look for fibers from Jaime's shirt. Defendants argued that the Gammills had shown no purpose for further inspection and continued to urge disqualification of Huston and Lowry. After hearing argument, the court deferred ruling to permit mediation.

When mediation failed to produce a settlement, the district court conducted another hearing to rule on the pending motions. A few minutes before that hearing, the Gammills filed a supplemental report by Lowry. Although it is not clear whether the court considered this report, the report did not differ materially from Lowry's earlier affidavit. At the hearing, the court granted defendants' motion to disqualify Huston and Lowry, holding that they were not qualified to testify about the matters in their affidavits, and that their opinions were not scientifically reliable. The court later signed orders setting out findings and conclusions regarding Huston's and Lowry's qualifications and opinions. The court also denied plaintiffs' motion for further inspection of the vehicle and granted defendants' motion for summary judgment.

The court of appeals reviewed Huston's and Lowry's qualifications and opinions in detail and concluded that neither was qualified to offer opinions on the subjects covered by their affidavits, and that their opinions had not been shown to be reliable.^[5] The court also concluded that because seven experts designated by the Gammills at various times had inspected the vehicle on a total of twelve occasions, and the district court had offered to permit additional inspections if some reason could be shown for doing so, the district court did not abuse its discretion in eventually denying the Gammills further inspection of the vehicle.^[6] Accordingly, the court of appeals affirmed the summary judgment.

We granted the Gammills' application for writ of error.^[7] In this Court, the Gammills argue that Huston and Lowry were qualified as experts, that their opinions were reliable, and that they were denied a reasonable inspection of the vehicle. The Gammills do not argue that defendants' experts' affidavits were insufficient to support summary judgment. Thus, if the Gammills' arguments fail, the summary judgment must remain undisturbed. We examine each of these arguments in turn.

II

Rule 702 of the Texas Rules of Evidence^[8] permits a witness qualified as an expert by knowledge, skill, experience, training, or education to testify on scientific, technical, or other specialized subjects if the testimony would assist the trier of fact in understanding the evidence or determining a fact issue. Whether an expert is qualified is, under Rule 104(a), a preliminary question to be decided by the trial court. "[T]he party offering the expert's testimony bears the burden to prove that the witness is qualified under [Rule] 702."^[9] The offering party must demonstrate that the witness "possess[es] special knowledge as to the very matter on which he proposes to give an opinion."^[10] A trial court's acceptance of a witness's qualifications as an expert is reviewable for an abuse of discretion.^[11]

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In *Broders v. Heise*, the issue was "whether the trial court abused its discretion in excluding the testimony of an emergency physician that the conduct of the three defendant emergency physicians and the defendant hospital was a cause in fact of a patient's death."^[12] Plaintiffs' expert testified without objection that defendants had breached the standard of care in treating plaintiffs' decedent, but defendants objected to the expert's testimony that their negligence caused the patient's death. Defendants argued that plaintiff's expert was not qualified to testify on the issue of causation, and their experts testified that the patient's death could not have been prevented regardless of what treatment she received. Plaintiffs' expert's knowledge of medicine was not shown to extend to the effectiveness of the possible treatments he identified. We held that the district court did not abuse its discretion in excluding plaintiffs' expert's opinion on causation because, while the expert plainly had greater knowledge of medicine generally than a lay person, he was not shown to have specialized knowledge on the precise subject of causation.^[13] "[G]iven the increasingly specialized and technical nature of medicine," we wrote, "there is no validity, if there ever was, to the notion that every licensed medical doctor should be automatically qualified to testify as an expert on every medical question."^[14]

In the present case, we have no difficulty in holding that the district court did not abuse its discretion in excluding Lowry's testimony. Just as not every physician is qualified to testify as an expert in every medical malpractice case, not every mechanical engineer is qualified to testify as an expert in every products liability case. Trial courts must "ensur[e] that those who purport to be experts truly have expertise concerning the actual subject about which they are offering an opinion."^[15] Lowry was shown to be experienced in designing and testing fighter planes and missiles, but he was not shown to have any training or experience in the design or manufacture of automobiles or their relevant components. Indeed, his only experience with automobiles at all was while working part-time as a mechanic doing general repairs while completing his master's degree. Lowry has not been shown to have any expertise that would qualify him to testify about design defects in a vehicle's accelerator or restraint system. Nor has Lowry been shown to be qualified to testify as to the cause of Jaime's injuries or death.

Huston, too, lacks any qualifications to testify concerning the cause of Jaime's death. However, Huston has been shown to be qualified to testify about defects in the rear seat belt of the Gammills' vehicle. He is a licensed engineer with a long academic career. He has researched vehicular restraint systems, some of them like the system in the Gammills' vehicle,

and has published articles on the subject. He has also testified in numerous cases involving allegations of seat belt defects. The district court abused its discretion in holding that Huston was not qualified to testify that the rear restraint system in the Gammills' vehicle was defective.

720 Only Lowry opined that the wiring harness in the Gammills' vehicle was defectively placed. Because Lowry was properly disqualified as an expert, the Gammills have no evidence to contradict defendants' experts' affidavits that the wiring harness was not defective and could not have caused the accident. Thus, the Gammills have failed to raise an issue of fact regarding defendants' liability for Deborah's injuries. The statement in Huston's affidavit that Deborah's seat belt "did not prevent her incapacitating injuries from the impact and occupant compartment intrusion" merely states the obvious; Huston's affidavit does not say that Deborah's seat belt *should have* prevented her injuries. The Gammills do not allege any defect in Deborah's seat belt. The remaining *720 issue, then, is whether Huston's affidavit regarding the rear seat belt raises fact issues concerning defendants' liability for Jaime's injuries and death.

This issue is not resolved by our conclusion that Huston was not qualified to opine on the cause of Jaime's death. Defendants' summary judgment evidence is that Jaime was not wearing her seat belt and that it was not defective. Defendants have not offered evidence that Jaime would have died even if the seat belt was defective as the Gammills allege. If a fact issue remains concerning whether the seat belt was defective, then defendants' motion should not have been granted. Accordingly, we turn to the Gammills' argument that Huston's opinions concerning defects in the rear seat belt were reliable.

III

After the United States Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*^[16] construing Rule 702 of the Federal Rules of Evidence, and the Texas Court of Criminal Appeals' decision in *Kelly v. State*^[17] construing the identical Rule 702 of the Texas Rules of Criminal Evidence, we held in *E.I. du Pont de Nemours and Co. v. Robinson*^[18] that the same Rule 702 of the Texas Rules of Civil Evidence requires a proponent of scientific expert testimony to demonstrate that such evidence is relevant and reliable before it can be admitted.

In order to constitute scientific knowledge which will assist the trier of fact, the proposed testimony must be relevant and reliable.

The requirement that the proposed testimony be relevant incorporates traditional relevancy analysis under Rules 401 and 402 of the Texas Rules of Civil Evidence. To be relevant, the proposed testimony must be "sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute." Evidence that has no relationship to any of the issues in the case is irrelevant and does not satisfy Rule 702's requirement that the testimony be of assistance to the jury. It is thus inadmissible under Rule 702 as well as under Rules 401 and 402.

In addition to being relevant, the underlying scientific technique or principle must be reliable. Scientific evidence which is not grounded "in the methods and procedures of science" is no more than "subjective belief or unsupported speculation." Unreliable evidence is of no assistance to the trier of fact and is therefore inadmissible under Rule 702.

There are many factors that a trial court may consider in making the threshold determination of admissibility under Rule 702. These factors include, but are not limited to:

- (1) the extent to which the theory has been or can be tested;
- (2) the extent to which the technique relies upon the subjective interpretation of the expert;
- (3) whether the theory has been subjected to peer review and/or publication;
- (4) the technique's potential rate of error;

(5) whether the underlying theory or technique has been generally accepted as valid by the relevant scientific community; and

(6) the non-judicial uses which have been made of the theory or technique.

We emphasize that the factors mentioned above are non-exclusive. Trial courts may consider other factors which are helpful to determining the reliability of the scientific evidence. The factors a trial court will find helpful in determining whether the underlying theories and techniques of the proffered evidence are scientifically reliable will differ with each particular case.^[19]

721 *Robinson*, like *Daubert* and *Kelly*, states a general principle—that scientific expert testimony must be relevant and reliable to be *721 admitted under Rule 702—and a list of factors to be considered in applying the principle to particular testimony.

The Gammills concede that Huston's testimony is scientific, as indeed they must. Huston's testimony is based on mechanical engineering. Mechanical engineering is science. Nevertheless, the Gammills argue that the scrutiny of reliability required by *Robinson* is reserved for opinions based on novel science, as opposed to established science. The Gammills also argue that opinions based on an expert's individual skill, experience, or training are not subject to the *Robinson* reliability test. We examine each argument.

A

In *Daubert*, the Supreme Court expressly rejected the argument that federal Rule 702's requirement that expert testimony be reliable applied "specifically or exclusively to unconventional evidence."^[20] The Texas Court of Criminal Appeals has likewise rejected the argument as to the identical Texas rule:

Nowhere in *Kelly* did we limit the two-pronged [relevance and reliability] standard to *novel* scientific evidence. The Supreme Court in *Daubert* directly addressed the issue in a footnote, stating "[a]lthough the *Frye* decision itself focused exclusively on 'novel' scientific techniques, we do not read the requirements of Rule 702 to apply specifically or exclusively to unconventional evidence." *Daubert*, 509 U.S. at 593 n. 11, 113 S.Ct. at 2796 n. 11. The Supreme Court noted that "under the Rules, the trial judge must ensure that *any and all scientific testimony* or evidence admitted is not only relevant, but reliable." *Id.* at 589, 113 S.Ct. at 2795 (emphasis added). We likewise see no value in having a different standard of admissibility for novel scientific evidence. The problems presented in determining whether or not a particular type of evidence would be considered "novel" are daunting enough to reject application of a dual standard. Moreover, we observe that the factors and criteria set forth in *Kelly* as bearing upon the reliability of proffered scientific evidence are adequate measure for assuring that "novel" scientific evidence which is "junk science" is excluded. These factors "address the soundness of the underlying scientific theory and technique." *Jordan v. State*, 928 S.W.2d 550, 554 (Tex.Crim.App.1996).^[21]

Similarly, the consensus of federal circuit courts that have addressed *Daubert's* scope is that its application is not limited to novel scientific methodologies but, at a minimum, extends to all scientific expert testimony proffered under Federal Rule of Evidence 702.^[22]

722 Like these courts, we believe that the rules governing admission of scientific evidence should not differ depending on whether the evidence is considered novel or unconventional. In *Robinson*, we expressed concern that "[p]rofessional expert witnesses are available to render an opinion on almost any theory, *722 regardless of its merit. While many of these experts undoubtedly hold reliable opinions which are of invaluable assistance to the jury, there are some experts who `are more than willing to proffer opinions of dubious value for the proper fee."^[23] We also observed that expert witnesses can have a prejudicial impact on the jury:

A witness who has been admitted by the trial court as an expert often appears inherently more credible to the jury than does a lay witness. Consequently, a jury more readily accepts the opinion of an expert witness

as true simply because of his or her designation as an expert.^[24]

Based on the proliferation and potential prejudice of expert testimony, we concluded that "trial judges have a heightened responsibility to ensure that expert testimony show some indicia of reliability."^[25] The concerns we articulated in *Robinson* exist regardless of whether the scientific evidence presented is novel or conventional. We therefore hold that the standard adopted in *Robinson* applies to all scientific expert testimony.

B

The argument that scientific opinion based on a witness's individual skill, experience, or training need not meet the *Robinson* reliability and relevance requirements at all, or must meet them in a fundamentally different way than scientific testimony, is more complex and raises the issue whether those requirements apply to all expert evidence offered under Rule 702. On the one hand, an exception for evidence based on a witness's skill and experience would easily swallow the rule. Any witness qualified to testify as an expert would almost necessarily possess the requisite skill and experience to support such testimony. If that were all Rule 702 required, merely establishing the witness's qualifications would show the relevance and reliability of the testimony every time. On the other hand, there are many instances when the relevance and reliability of an expert witness's testimony *are* shown by the witness's skill and experience. An experienced car mechanic's diagnosis of problems with a car's performance may well be relevant and reliable without resort to engineering principles.

The federal circuit courts have struggled to apply *Daubert's* general requirements of relevance and reliability in the context of testimony based on skill and experience when the factors enumerated in *Daubert* to be considered in admitting scientific testimony do not fit. In *Compton v. Subaru of America, Inc.*,^[26] plaintiff, a passenger in a station wagon, alleged that the injuries he sustained in a rollover accident were caused by the defective design of the vehicle. Plaintiff was riding around with four other teenagers, drinking beer, when one of them yanked on the steering wheel, causing the driver to lose control. Plaintiff, seated in the rear of the vehicle and not wearing his seat belt, suffered a spinal cord injury resulting in quadriplegia. Plaintiff claimed that "there was `excessive and extensive intrusion of the roof and side of the automobile into the passenger compartment during the rollover."^[27] Over the defendants' objection, the plaintiff's expert, an aerospace and mechanical engineer, testified that the accident vehicle's roof support structures were defective because they did not prevent the roof from being crushed in excessively. The expert based his testimony on "measurements compiled from hundreds of other accident vehicles he had examined during his eight-year career as a `consulting engineer", standards separately proposed by a vehicle manufacturer and a federal agency but never adopted, and other reports and papers.^[28] The district court expressed doubt about the expert's testimony, remarking that the expert's design specifications seemed

723 "more applicable to a Sherman tank than to any vehicle which the ordinary consumer would *723 drive."^[29] Nevertheless, the court admitted the evidence and rendered judgment on a verdict finding defendants 56 percent at fault.^[30] The Tenth Circuit rejected defendants' argument that plaintiff's expert's testimony was unreliable. According to the court, "*Daubert* sets out additional factors the trial court should consider under Rule 702 if an expert witness offers testimony based upon a particular methodology or technique."^[31] *Daubert* did not apply, the court concluded, to plaintiff's expert who reached his conclusions instead "by drawing upon general engineering principles and his twenty-two years of experience as an automotive engineer."^[32]

The *Compton* court's refusal to apply the *Daubert* factors to the engineering expert's testimony appears correct. At least some of those factors—such as the requirement of peer review and an assessment of the rate of error of the technique the expert relied on— simply do not fit testimony like that offered. But while the court did not apply the *Daubert* factors, it did, at least implicitly, apply the more general requirements stated in *Daubert* that expert testimony be shown to be relevant and reliable.

The Ninth Circuit, citing *Compton*, has pointed out this distinction. In *McKendall v. Crown Control Corp.*,^[33] a forklift operator was injured when a sofa slid off the forklift's cargo platform onto the operator's platform, pinning his legs. The forklift manufacturer moved to exclude the operator's proposed expert, a mechanical and metallurgical engineer, who would have testified that the forklift was defectively designed because it lacked a movable barrier or guard, interlocked

with the operating controls, to protect the operator from sliding cargo. The district court excluded the testimony as scientifically unreliable under *Daubert* and granted summary judgment for defendants. The Ninth Circuit reversed, holding that the expert's testimony did not relate to scientific knowledge but was "based on his experience as a mechanical engineer who has investigated hundreds of forklift accidents."^[34] Quoting *Compton*, the court concluded that the testimony was "'facially helpful and relevant' and seemingly reliable."^[35] The court added, however:

Our Circuit has made what seem to be conflicting pronouncements as to whether *Daubert* applies to all expert testimony or only to scientific knowledge. Compare [*United States v. Cordoba*, 104 F.3d 225, 230 (9th Cir.1997)] ("*Daubert* applies only to the admission of scientific testimony.") and [*Thomas v. Newton Int'l Enter.*, 42 F.3d 1266, 1270 n. 3 (9th Cir.1994)] ("*Daubert* was clearly confined to the evaluation of scientific expert testimony.") with [*Southland Sod Farms v. Stover Seed Co.*, 108 F.3d 1134, 1143 n. 8 (9th Cir.1997)] ("*Daubert*'s holding applies to all expert testimony, not just testimony based on novel scientific methods.") and [*Claar v. Burlington Northern R. Co.*, 29 F.3d 499, 501 n. 2 (9th Cir.1994)] (noting that *Daubert*'s requirements "apply to all proffered expert testimony—not just testimony based on novel scientific methods or evidence."). All of the pronouncements are dicta except those in *Thomas* and in *Cordoba*. *Cordoba* holds that *Daubert* is inapplicable in determining whether expert testimony regarding the modus operandi of narcotics traffickers is admissible. *Cordoba*, 104 F.3d at 230. The *Cordoba* court, in stating that *Daubert* only applies to the admissibility of "scientific" testimony, is correct, at least in a narrow sense, as to *Daubert*'s applicability. However, if one views *Daubert* in a broader context, the *Daubert* Court is giving strong advice to district courts: in ruling on admissibility, trial judges are the gatekeepers and should pay particular attention to the reliability of the expert and his or her testimony. See *Daubert*, 509 U.S. at 590, 113 *724 S.Ct. at 2795. In that sense, *Daubert* applies to all expert testimony.^[36]

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In other words, even if the specific factors set out in *Daubert* for assessing the reliability and relevance of scientific testimony do not fit other expert testimony, the court is not relieved of its responsibility to evaluate the reliability of the testimony in determining its admissibility.

The Fourth Circuit was not as clear in *Freeman v. Case Corp.*^[37] There, plaintiff alleged that while he was riding a tractor pulling a mower, he released the speed ratio pedal that made the tractor move and depressed the brake pedal, only to have the tractor suddenly lunge forward, fall over an embankment, and roll over him with its mower blades still turning. Plaintiff contended that the tractor was defectively designed because its pedals were too close together and it lacked an "operator presence control". A mechanical engineer who for many years designed tractors and mowers for a competitor testified in support of these contentions, basing his opinions on his training and experience, his review of professional society papers, "extensive industry literature, various tractor specifications and trade journals",^[38] and his tests showing how the tractor would lurch as the plaintiff claimed. The district court admitted the testimony but, following trial, granted judgment as a matter of law for defendant, holding that the tractor's defects were open and obvious and that the evidence was insufficient to show a defect in the pedal configuration.^[39] The court of appeals reversed, holding that the expert's testimony supported the verdict. Citing *Compton*, the court noted:

[Defendant] misunderstands the *Daubert* test in attempting to apply it here. *Daubert* instructs district courts to make a "preliminary assessment of whether the reasoning or methodology" underlying expert testimony "is scientifically valid." Essentially, [defendant] does not challenge [plaintiff's expert's] "reasoning or methodology" but his ultimate conclusion, that the [tractor] is unreasonably dangerous. In cases like this one, where an expert relies on his experience and training and not a particular methodology to reach his conclusions, "application of the *Daubert* [analysis] is unwarranted."^[40]

By the *Daubert* "analysis", it is not clear whether the court meant the several factors for evaluating scientific testimony or the more general requirements of relevance and reliability.

Two other circuits have tried to distinguish scientific testimony from testimony based on experience. In *Berry v. City of Detroit*,^[41] plaintiff sued for the wrongful death of her son which she alleged was caused by a police officer's unlawful use

of deadly force. To prove that the city was at fault for failing to train and discipline police officers, plaintiff adduced, and the district court admitted, the testimony of a person who had worked for several years in law enforcement. On appeal, the Sixth Circuit distinguished between scientific and non-scientific expert testimony, aptly explaining:

[I]f one wanted to explain to a jury how a bumblebee is able to fly, an aeronautical engineer might be a helpful witness. Since flight principles have some universality, the expert could apply general principles to the case of the bumblebee. Conceivably, even if he had never seen a bumblebee, he still would be qualified to testify, as long as he was familiar with its component parts.

On the other hand, if one wanted to prove that bumblebees always take off into the wind, a beekeeper with no scientific training at all would be an acceptable expert witness if a proper foundation were laid for his conclusions. The foundation would not relate to his formal training, but to his firsthand observations. In other words, the beekeeper does not know any more about flight principles than the jurors, ⁷²⁵ but he has seen a lot more bumblebees than they have.^[42]

The court concluded that plaintiff's expert was more like the beekeeper than the aeronautical engineer, but that the reliability of the expert's testimony must nevertheless be evaluated. Although "*Daubert* dealt with scientific experts," the court observed, "its language relative to the 'gatekeeper' function of federal judges is applicable to all expert testimony offered under Rule 702."^[43] The court concluded that the expert's testimony was not reliable and should not have been admitted. Thus, the court applied the general principles of *Daubert* but not its specific factors.

The Eleventh Circuit made the same point in *Carmichael v. Samyang Tire, Inc.*^[44] The district court excluded the testimony of an expert concerning the reasons a car tire failed because the testimony failed to satisfy the *Daubert* criteria. The appeals court reversed, holding that the *Daubert* criteria could not be applied because the expert's testimony was more like that of the beekeeper in the *Berry* analogy. "Still," the court added, "the inapplicability of *Daubert* should not end the day regarding [the expert's] reliability. Under Rule 702, it is the district court's duty to determine if [the expert's] testimony is sufficiently reliable and relevant to assist a jury."^[45]

In a Fifth Circuit case, *Watkins v. Telsmith, Inc.*,^[46] a gravel wash plant employee was killed when the conveyor he was operating fell on him. His widow sued, alleging that the conveyor was defectively designed because it was supported by only one wire rope. In support of her claim, plaintiff offered the testimony of a civil engineer, who claimed that the conveyor was unreasonably dangerous and that alternative designs were feasible. However, the expert never made cost calculations or design drawings to support his opinions that the existing design was defective or that an alternative design was safer. The district court excluded the expert's testimony. The Fifth Circuit affirmed, rejecting *Compton's* view that an expert's opinions can avoid scrutiny under *Daubert* merely because they are based on his experience and training. The court reasoned:

We cannot agree with the *Compton* court's conclusion that *Daubert* only applies when "unique, untested or controversial methodologies or techniques" are relied on by the expert.... [T]he nonexclusive list of factors relevant under *Daubert* to assessing scientific methodology—testing, peer review, and "general acceptance"—are also relevant to assessing other types of expert evidence. Whether the expert would opine on economic valuation, advertising psychology, or engineering, application of the *Daubert* factors is germane to evaluating whether the expert is a hired gun or a person whose opinion in the courtroom will withstand the same scrutiny that it would among his professional peers.

Compton also suffers from the vagueness of the line it draws between "methodology" and other scientific or technical knowledge.... Alternative designs by definition include elements of science, technology, and methodology. Further, it seems exactly backwards that experts who purport to rely on general engineering principles and practical experience might escape screening by the district court simply by stating that their conclusions were not reached by any particular method or technique. The moral of this approach would be, the less factual support for an expert's opinion, the better. *Compton's* view of the admissibility of expert evidence is untenable.

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We conclude that whether an expert's testimony is based on "scientific, technical or other specialized knowledge," *Daubert* and Rule 702 demand that the district court evaluate the methods, analysis, and principles relied upon in reaching the opinion. The court should ensure that the *726 opinion comports with applicable professional standards outside the courtroom and that it "will have a reliable basis in the knowledge and experience of [the] discipline."^[47]

We agree with the Fifth, Sixth, Ninth, and Eleventh Circuits that Rule 702's fundamental requirements of reliability and relevance are applicable to all expert testimony offered under that rule. Nothing in the language of the rule suggests that opinions based on scientific knowledge should be treated any differently than opinions based on technical or other specialized knowledge. It would be an odd rule of evidence that insisted that some expert opinions be reliable but not others. All expert testimony should be shown to be reliable before it is admitted.^[48]

That said, it is equally clear that the considerations listed in *Daubert* and in *Robinson* for assessing the reliability of scientific evidence cannot always be used with other kinds of expert testimony. To borrow the *Berry* court's analogy, a beekeeper need not have published his findings that bees take off into the wind in a journal for peer review, or made an elaborate test of his hypotheses. Observations of enough bees in various circumstances to show a pattern would be enough to support his opinion. But there must be some basis for the opinion offered to show its reliability. Experience alone may provide a sufficient basis for an expert's testimony in some cases, but it cannot do so in every case. A more experienced expert may offer unreliable opinions, and a lesser experienced expert's opinions may have solid footing. The court in discharging its duty as gatekeeper must determine how the reliability of particular testimony is to be assessed. As the United States Supreme Court recently stated in *General Electric Co. v. Joiner*:

[N]othing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.^[49]

The same is true of *Robinson* and the Texas Rules of Evidence: "[I]t is not so simply because 'an expert says it is so'".^[50]

In determining whether *Daubert* applies to particular expert testimony, some courts have confused two aspects of *Daubert*: on the one hand, the construction of Rule 702 to require that expert testimony be reliable and relevant, and on the other hand, the considerations to be used in determining the reliability of scientific opinion. This explains, we think, the apparently conflicting statements in Ninth Circuit opinions referred to in *McKendall*. The reliability and relevance prerequisites for expert opinion to be admissible are part of Rule 702 and apply to all such evidence. In that sense, *Daubert* applies to all expert testimony. *Daubert* does not apply in the sense that the considerations it set out for determining whether the prerequisites are satisfied cannot be applied to all types of evidence. As the court in *McKendall* explained: "[I]n ruling on admissibility, trial judges are the gatekeepers and should pay particular attention to the reliability of the expert and his or her testimony. In that sense, *Daubert* applies to all expert testimony."^[51]

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The results in *McKendall* and *Freeman* are consistent with this view. In both those cases experts testified about specific defects and design changes based on years of experience with the product itself and others like it, a knowledge of the industry, and publications on the subject. Their testimony was admitted *727 because the bases for it were shown to be reliable. Only the result in *Compton* is inconsistent with our view. In that case, plaintiff's expert testified to little more than that the station wagon should have been designed so that its roof would not give more than a few inches in a rollover. The feasibility and marketability of such a design were not considered. Unlike the experts' opinions in *McKendall* and *Freeman*, the expert's opinion in *Compton* was supported by little more than his credentials as an engineer.

Although it appears that the United States Supreme Court will address the issue in *Carmichael*,^[52] at this point the clear weight of federal case law supports applying the relevance and reliability requirements of Rule 702 to all expert evidence offered under that rule, even though the criteria for assessing relevance and reliability must vary, depending on the nature of the evidence. Because we are persuaded that this construction of federal Rule 702 is correct, because our rule is identical but for one comma, and because there is much to be said for maintaining as much uniformity in state and federal evidence rules as possible, we hold that the relevance and reliability requirements of Texas Rule 702 apply to all evidence

offered under that rule, and that the trial court must determine that these requirements have been met before admitting the evidence.

C

The *Robinson* factors for assessing the reliability of scientific evidence cannot be applied to the testimony offered by the Gammills' experts, even though mechanical engineering, the expertise claimed by the witnesses, is scientific in nature. But Rule 702's general requirement of reliability must still be satisfied, and the district court concluded that Huston's testimony was unreliable. In essence, the district court applied the test stated in *Joiner*: whether "there is simply too great an analytical gap between the data and the opinion proffered."^[53] The decision was one within its discretion, which we review for abuse.^[54]

The "analytical gap" between the data in this case and Huston's opinion was not shown to be due to his techniques in assessing the vehicle restraint system. On the contrary, Huston based his conclusions on observations and testing similar to those employed by defendants' experts. Rather, the "gap" in Huston's analysis was his failure to show how his observations, assuming they were valid, supported his conclusions that Jaime was wearing her seat belt or that it was defective. The district court was not required, in *Joiner*'s words, "to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert."^[55]

Huston based his opinion that Jaime was wearing her seat belt on "gliding abrasions found on her body, markings on the shirt she was wearing, apparent shirt fibers observed in the seat belt webbing, marks on the seat belt webbing, and the impact location on the driver's seat back". Huston did not specify the gliding abrasions on Jaime's body, or his basis for attributing them to the seat belt. He made no attempt to explain why the markings on Jaime's shirt are distinctive or how they are typical of seat belt loading. He has not concluded that fibers from the shirt Jaime was wearing were in fact in the seat belt webbing, only that "apparent shirt fibers" were present. Nor has Huston explained or excluded other possibilities for the presence of any such fibers. From his testimony, the significance of any dimple or warping in Jaime's shoulder belt is unclear, and Huston has not explained how their presence supports his theory that Jaime's seat belt released prematurely. Finally, Huston has not explained why Jaime's presence on the floor between the seats after the accident is not at least as consistent with her not having worn her seat belt as with his opinion that she was wearing it. Regarding
728 defects in the restraint system design, Huston testified that *728 the belt could loosen and that the position of the push-button release was such that it could accidentally be bumped in a collision. Assuming Huston was correct, he has offered nothing to suggest that what he believes *could have* happened actually *did* happen. His opinions are little more than "subjective belief or unsupported speculation."^[56]

The trial court's gatekeeping function under Rule 702 does not supplant cross-examination as "the traditional and appropriate means of attacking shaky but admissible evidence."^[57] But neither does the availability of cross-examination relieve the trial court of its threshold responsibility under Rule 702 "of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand."^[58] We recognize that the trial court's task is sometimes a difficult one. The trial court is not to determine whether an expert's conclusions are correct, but only whether the analysis used to reach them is reliable. In the case before us, although the issue is a close one, under the circumstances we believe the district court did not abuse its discretion in rejecting Huston's opinions as unreliable.

IV

We are left with whether the district court denied Huston a reasonable opportunity to inspect the Gammills' vehicle. Following the hearing on the Gammills' motion for further inspection, the district court instructed that Huston and Lowry be permitted another examination of the vehicle but prohibited them from removing any part of it. The court provided that after such inspection it would consider additional testing if necessary. Huston and Lowry both re-examined the vehicle, and Lowry requested additional testing, but Huston did not. The Gammills moved to be permitted to remove the rear restraint

system but did not ask for a hearing on their motion. At the summary judgment hearing, the Gammills mentioned their motion but did not explain why it was necessary to remove the seat belt system from the vehicle to search for shirt fibers and abrasions. After all, Huston had already averred that shirt fibers were present. Moreover, defendants' experts' stated in their affidavits that, based on testing of seat belt exemplars, the metal materials in the seat belt were so hard that no meaningful abrasions could be found. The Gammills' experts never challenged this testimony.

The Gammills argue that we permitted testing similar to what they have requested in *General Motors Corp. v. Tanner*.^[59] That case presented very different circumstances. There the request for testing explained the need and averred that the subject of the test would not be destroyed. The Gammills did neither. We do not retreat from *Tanner*. Had the Gammills offered any cogent reason for the requested inspections in their numerous pleadings or at the many hearings the district court conducted, we would hold that their access to crucial evidence had been unduly restricted. Even absent good reasons for further inspections, the district court might have removed lingering doubt about what might be revealed had it allowed the inspections. But in the circumstances of this case we cannot say that the district court abused its discretion in calling a halt to the Gammills' examination of the vehicle after permitting seven of their experts to inspect the vehicle a total of twelve times, and having offered to allow further inspections if a specific need could be shown.

* * * * *

For these reasons, the judgment of the court of appeals is *Affirmed*.

[1] 875 S.W.2d 27.

[2] *Gammill v. Jack Williams Chevrolet, Inc.*, 875 S.W.2d 27 (Tex.App.—Fort Worth 1994, writ denied).

[3] 923 S.W.2d 549 (Tex.1995).

[4] See TEX.R. CIV. P. 167(1)(g) ("Testing or examination shall not extend to destruction or material alteration of an article without notice, hearing, and prior approval by the court.").

[5] 875 S.W.2d at 29.

[6] *Id.*

[7] 40 TEX. SUP. CT. J. 948 (Sept. 4, 1997).

[8] Effective March 1, 1998, the Texas Rules of Evidence replaced the former Texas Rules of Civil Evidence. Since none of the changes in the new rules affect this case, all references to rules are to the current Texas Rules of Evidence unless otherwise noted.

[9] *Broders v. Heise*, 924 S.W.2d 148, 151 (Tex. 1996); accord, *Penry v. State*, 903 S.W.2d 715, 762 (Tex.Crim.App.), cert. denied, 516 U.S. 977, 116 S.Ct. 480, 133 L.Ed.2d 408 (1995) ("The party proffering the expert witness bears the burden of showing that the witness is qualified on the specific matter in question."); *Matson v. State*, 819 S.W.2d 839, 851 (Tex.Crim.App.1991) ("The initial burden of establishing a witness's qualifications lies with the party offering the testimony.") (both construing identical criminal evidence rule).

[10] *Broders*, 924 S.W.2d at 152-153 (quoting 2 Ray, Texas Law of Evidence: Civil and Criminal § 1401 at 32 (Texas Practice 3d ed.1980)).

[11] *Id.* at 151.

[12] *Id.* at 149.

[13] *Id.* at 153-154.

[14] *Id.* at 152.

[15] *Id.*

[16] 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

[17] 824 S.W.2d 568 (Tex.Crim.App.1992).

[18] 923 S.W.2d 549, 556 (Tex.1995).

[19] *Id.* at 556-557 (citations and footnote omitted).

[20] Daubert, 509 U.S. at 592 n. 11, 113 S.Ct. 2786 ("Although [Frye v. United States, 293 F. 1013 (D.C.Cir.1923)] focused exclusively on `novel' scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence. Of course, well-established propositions are less likely to be challenged than those that are novel, and they are more handily defended. Indeed, theories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Federal Rule of Evidence 201.").

[21] Hartman v. State, 946 S.W.2d 60, 62-63 (Tex.Crim.App.1997)(footnote omitted).

[22] Watkins v. Telsmith, Inc., 121 F.3d 984, 991 (5th Cir.1997) ("We cannot agree ... that *Daubert* only applies when `unique, untested or controversial methodologies or techniques' are relied on by the expert."); Southland Sod Farms v. Stover Seed Co., 108 F.3d 1134, 1143 n. 8 (9th Cir.1997) ("*Daubert's* holding applies to all expert testimony, not just testimony based on novel scientific methods."); Peitzmeier v. Hennessy Indus., Inc., 97 F.3d 293, 297 (8th Cir.1996), cert. denied, _____ U.S. _____, 117 S.Ct. 1552, 137 L.Ed.2d 701 (1997) (refusing to limit *Daubert's* application to novel scientific testimony); Tyus v. Urban Search Management, 102 F.3d 256, 263 (7th Cir.1996) ("[W]e do not agree ... that [*Daubert's* application] is limited to cases of novel scientific theories or methodologies."). *But cf.* Compton v. Subaru of America, Inc. 82 F.3d 1513, 1519 (10th Cir.1996) ("Subsequent to *Daubert*, we have continued to apply essentially the same Rule 702 analysis except in cases involving unique, untested, or controversial methodologies or techniques.").

[23] Robinson, 923 S.W.2d at 553 (citations omitted).

[24] *Id.* (citations omitted).

[25] *Id.*

[26] 82 F.3d 1513 (10th Cir.1996).

[27] *Id.* at 1516.

[28] *Id.* at 1516-1517.

[29] *Id.* at 1516.

[30] *Id.* at 1517.

[31] *Id.* at 1519.

[32] *Id.*

[33] 122 F.3d 803 (9th Cir.1997).

[34] *Id.* at 806.

[35] *Id.* at 807.

[36] *Id.* at 806-807 n. 1.

[37] 118 F.3d 1011 (4th Cir.1997).

[38] *Id.* at 1013-1016.

[39] *Id.* at 1014.

[40] *Id.* at 1016 n. 6 (citations omitted).

[41] 25 F.3d 1342 (6th Cir.1994).

[42] *Id.* at 1349-1350 (emphasis omitted).

[43] *Id.* at 1350.

[44] 131 F.3d 1433 (11th Cir.1997), cert. granted sub nom. Kumho Tire Co. v. Carmichael, _____ U.S. _____, 118 S.Ct. 2339, 141 L.Ed.2d 711 (1998).

[45] *Id.* at 1436.

[46] 121 F.3d 984 (5th Cir.1997).

[47] *Id.* at 991 (citations and footnotes omitted).

[48] See David J. Beck et al., *Standards and Procedures for Determining the Admissibility of Expert Evidence After Daubert*, 157 F.R.D. 571, 577 (1994) (report approved by the Executive Committee and Board of Regents of the American College of Trial Lawyers) ("[I]t is preferable that there be a single conceptual framework for evaluating the admissibility of all types of expert evidence.").

[49] ___ U.S. ___, ___, 118 S.Ct. 512, 519, 139 L.Ed.2d 508 (1997).

[50] *Merrell Dow Pharmaceuticals, Inc. v. Havner*, 953 S.W.2d 706, 712 (Tex.1997) (citation omitted).

[51] *McKendall*, 122 F.3d at 806-807 n. 1 (citation omitted).

[52] *Carmichael v. Samyang Tire Inc.*, 131 F.3d 1433 (11th Cir.1997), cert. granted sub nom. *Kumho Tire Co. v. Carmichael*, ___ U.S. ___, 118 S.Ct. 2339, 141 L.Ed.2d 711 (1998).

[53] *Joiner*, ___ U.S. at ___, 118 S.Ct. at 519.

[54] *Robinson*, 923 S.W.2d at 558; *Ginsberg v. Fifth Court of Appeals*, 686 S.W.2d 105, 108 (Tex.1985).

[55] *Joiner*, ___ U.S. at ___, 118 S.Ct. at 519.

[56] *Robinson*, 923 S.W.2d at 557.

[57] *Daubert*, 509 U.S. at 596, 113 S.Ct. 2786.

[58] *Id.* at 597, 113 S.Ct. 2786.

[59] 892 S.W.2d 862 (Tex.1995) (per curiam).

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