

IN THE SUPREME COURT OF TEXAS

No. 08-0175

WHIRLPOOL CORPORATION, PETITIONER,

v.

MARGARITA CAMACHO, ET AL., RESPONDENTS

ON PETITION FOR REVIEW FROM THE
COURT OF APPEALS FOR THE THIRTEENTH DISTRICT OF TEXAS

Argued March 10, 2009

JUSTICE JOHNSON delivered the opinion of the Court.

JUSTICE GUZMAN did not participate in the decision.

In this products liability case the jury found that a design defect in an electric Whirlpool clothes dryer caused a fatal fire. We must decide whether there is legally sufficient evidence that the dryer's design was defective because it incorporated a corrugated lint transport tube as part of its air circulation system. Because we conclude that the expert testimony of design defect is legally insufficient to support the verdict, we reverse the judgment of the court of appeals and render judgment for Whirlpool.

I. Background

A. General

In October 2002, Santos and Margarita Camacho purchased a used electric Whirlpool Easy Clean 100 clothes dryer from their daughter and installed it in their trailer home. Late in the evening of February 10, 2003, Margarita started the dryer and then lay down in an adjacent bedroom. Sometime later her teenage son Joab came into the bedroom to go to bed so Margarita moved to the living room. On her way, she opened the dryer door. At trial she did not recall whether the dryer had stopped running by that time, but she recalled that she did not notice anything unusual, nor did she see or smell smoke or fire.¹ Later, while she was in the living room, Margarita smelled smoke. She testified that she looked into the hallway, saw fire “coming from the rear part of the dryer and from inside the dryer,” and began yelling to alert the family. The fire destroyed the trailer home. All the family escaped except Joab, who was trapped in his bedroom and was killed.

The fire was investigated by local fire department and law enforcement officials, federal alcohol, tobacco, and firearms agents, and two experts hired by the Camachos’ attorneys. Several months later, Whirlpool was notified of the claim that the fire started in its dryer, and it also investigated. By that time the fire scene had been largely cleaned up and cleared and relevant debris, including the dryer, removed. Various theories were advanced for the fire’s cause, and different conclusions were drawn about whether the fire started in the dryer. The fire marshal concluded that

¹ On cross-examination Margarita acknowledged that in her deposition she testified the dryer had stopped running before she opened the door and that after she opened the door she checked the clothes, which were dry.

it did not; the experts hired by the Camachos' attorneys concluded that it did; Whirlpool concluded that it did not.

Margarita and Santos, individually and on behalf of Joab's estate and on behalf of their other sons, sued Whirlpool. They claimed that Whirlpool's use of a corrugated tube in the dryer's air circulation system was a design defect. Allegedly, the tube became clogged and caused lint to be discharged into the dryer cabinet where lint particles were ignited by the dryer's heater element and ignited particles were circulated into the dryer drum where they ignited the clothes. The Camachos asserted that the fire escaped the dryer drum through the back of the dryer cabinet and caught the trailer on fire. To prove their design defect claim, the Camachos relied on testimony from Judd Clayton, an electrical engineer.

B. The Clothes Dryer

A brief explanation of how a Whirlpool Easy Clean 100 clothes dryer operates will aid in understanding the parties' contentions and the testimony.²

When the drying cycle is started, a drum inside the dryer cabinet begins rotating, causing the clothes in it to tumble. Air is circulated through the drum, and a heating element is energized to heat the circulating air. At the end of the drying cycle, the heating element turns off and the dryer enters a cool-down cycle during which the drum continues rotating, the clothes continue tumbling, and the blower circulates unheated ambient air through the clothes. At the end of the cool-down cycle, the dryer automatically shuts off completely.

² See Appendix A for a diagram of the relevant parts of the dryer.

The dryer's air circulation system is designed so that a sealed blower fan draws air into and through the circulation system at a high speed and eventually expels the air through an exhaust vent at the rear of the dryer. The sealed blower fan is located in the lower back part of the cabinet. Air drawn into the circulation system passes through a heater box that is mounted on the lower rear part of the dryer opposite the blower assembly. The heater box is essentially an elongated rectangular-shaped metal box positioned vertically and open at its lower end so air from inside the dryer cabinet is drawn into the box at the lower end. The air travels vertically past the heater element, then continues vertically for several inches to a grill-covered inlet that opens into the dryer drum. The air passes through the inlet grill into the rotating dryer drum, flows through the dryer drum and tumbling clothes, exits through an outlet grill similar in configuration to the inlet grill, and passes into an enclosed lint chute assembly where it is drawn vertically down the back of the dryer cabinet to the blower assembly. When the air reaches the blower assembly at the base of the dryer, the lint is routed into a lint transport tube and carried vertically by airflow to a lint trap on top of the dryer. A screen in the lint trap filters lint from the circulating air. The circulating air then returns to the lint chute, travels back to the blower assembly, and is discharged out of the dryer through the exhaust vent by the blower. The exhaust of the Camachos' dryer was properly vented through the floor of the trailer.

C. Design Defect

Clayton's testimony was the only evidence of a design defect.³ He opined that the fire started when the clothes in the dryer drum were ignited by smoldering lint particles. Clayton's opinion was that the corrugated tube allowed lint to hang up on the inside of the tube and clog it.⁴ Even though both the blower assembly and the corrugated lint transport tube on the Camachos' dryer were consumed in the fire and not available for examination, Clayton was of the opinion that the tube was clogged and caused lint to back up into the blower housing assembly from where excessive amounts of it escaped by being blown through a gasket-like seal between the lint chute and the blower housing (the "lint chute seal") into the dryer cabinet. He theorized that the lint was forced through the lint chute seal, became airborne, and was drawn into the heater box. He reasoned that some airborne lint particles then passed through the heater box, were ignited as they passed by the heater element, and traveled vertically to the inlet grill. There they either entered the drum or came into contact with and ignited other lint that had become attached to the inlet grill, and then the newly-ignited lint entered the rotating drum. Basing his opinion on pretrial statements by Margarita that the dryer had shut off before she opened the dryer door, Clayton's opinion was that once the ignited

³ At trial, Eduardo Sanchez, a fire and explosives investigator hired by the Camachos, also testified. Relying on Clayton's investigation, opinions, and expertise with dryers, Sanchez concluded that the fire originated inside the dryer cabinet when lint was somehow ignited by the heating element. He did not express any opinion as to how the heating element ignited the lint or that the fire started because clothes in the dryer's drum were ignited. He did not find any burnt lint inside the Camacho dryer cabinet base beneath the heating element, on the dryer's heating element, on the inlet screen to the dryer drum, or in the dryer drum itself. He did not opine on the dryer's design.

⁴ Whirlpool presented evidence that a smooth lint transport tube had initially been used in the Easy Clean 100 model, but the smooth tube could become dislodged from the blower housing. A corrugated tube was then used, which fixed the problem.

lint was in the dryer drum, it landed in the drying, tumbling clothes,⁵ and smoldered there through the remainder of the drying and cool-down cycles and the period of time after the dryer shut off until Margarita opened the dryer door. He believed that when she opened the door, oxygen entered the drum and the increased oxygen level allowed the smoldering lint and clothes to burst into flames. His opinion was that the fire then escaped through the back of the dryer and ignited the Camachos' home.

Clayton also opined that a safer alternative design would have been to (1) use a smooth lint transport tube to prevent lint buildup in the tube, along with a different type of material for the lint chute seal and (2) mount a mesh lint filter of some nature over the airway entry to the heater box.

Whirlpool challenged almost every assertion made by the Camachos as to both liability and damages, including Clayton's assertion that lint particles ignited by the heating element ignited clothes in the dryer drum. Among its challenges, Whirlpool questioned whether there actually was fire inside the dryer drum and dryer cabinet independent of the fire that destroyed the Camachos' home. Whirlpool contended that there was no credible evidence of lint in the Camachos' dryer cabinet or in the dryer's heater element before the fire and that, even if blackened materials Clayton identified in a photograph as charred lint inside the cabinet had in fact been burnt lint, the charring was not evidence that the fire started inside the dryer cabinet or clothes drum because any lint present would have been charred by the intense heat of the fire, just as the rest of the trailer was.

⁵ Clayton agreed that the dryer would have been operating in its drying cycle if the heating element was energized so that lint was ignited by it.

Whirlpool objected to admission of Clayton's opinions as to design defect and safer alternative design on the ground that they were not reliable. It also challenged the legal sufficiency of the evidence to support the jury submission of design defect on the basis that Clayton's testimony was the only support for the submission and his testimony was not reliable, was based on unfounded assumptions, and was conclusory.

The jury found that a design defect in the dryer was a producing cause of the fire and Joab's death. Based on the verdict, the trial court entered judgment against Whirlpool.

D. Appeal

The court of appeals affirmed. 251 S.W.3d 88. The court acknowledged Whirlpool's legal sufficiency challenge to the evidence of a design defect, but then addressed the issue as a challenge to the admissibility of the testimony for unreliability. *Id.* at 98. In doing so, the court reviewed Clayton's testimony to determine whether the trial court abused its discretion in admitting it and determined that it did not. *Id.* Moreover, in reviewing the reliability of Clayton's testimony, the court of appeals concluded that his opinions were based on his experience, so its review was limited to determining whether an analytical gap existed between the data he used and his conclusions. *Id.* at 96. The review did not incorporate reliability factors such as those we referenced in *E.I. du Pont de Nemours & Co. v. Robinson*, 923 S.W.2d 549, 556 (Tex. 1995).

In this Court, Whirlpool renews its argument that (1) the evidence is legally insufficient to support the jury's findings of design defect and safer alternative design, (2) the evidence is legally insufficient to support the damages awarded, and (3) the trial court erred in denying Whirlpool's requested spoliation instruction in regard to the scene of the fire. Whirlpool also contends that the

court of appeals incorrectly analyzed the legal sufficiency of Clayton's expert testimony by (1) applying an abuse of discretion standard rather than a "de novo-like" review and (2) considering only whether there was an analytical gap in Clayton's methodology instead of also applying other relevant factors. *See id.*

The Camachos assert that the court of appeals conducted a sufficient review of Whirlpool's legal sufficiency challenge to Clayton's design defect testimony. They base their argument on the fact that after the appeals court concluded the trial court did not abuse its discretion in admitting Clayton's testimony, the court considered whether Whirlpool conclusively disproved the validity of Clayton's opinions and conclusions. 251 S.W.3d at 100. For the reasons set out below, we disagree that the appeals court conducted a proper legal sufficiency review of the evidence as to design defect.

II. Law

A. Expert Testimony

An expert witness may testify regarding scientific, technical, or other specialized matters if the expert is qualified, the expert's opinion is relevant, the opinion is reliable, and the opinion is based on a reliable foundation. *See* TEX. R. EVID. 702; *Mack Trucks, Inc. v. Tamez*, 206 S.W.3d 572, 578 (Tex. 2006); *Robinson*, 923 S.W.2d at 556. Conclusory or speculative opinion testimony is not relevant evidence because it does not tend to make the existence of material facts more probable or less probable. *See* TEX. R. EVID. 401; *Coastal Transp. Co. v. Crown Cent. Petroleum Corp.*, 136 S.W.3d 227, 232 (Tex. 2004).

When expert testimony is involved, courts are to rigorously examine the validity of facts and assumptions on which the testimony is based, as well as the principles, research, and methodology

underlying the expert's conclusions and the manner in which the principles and methodologies are applied by the expert to reach the conclusions. See *Exxon Pipeline Co. v. Zwahr*, 88 S.W.3d 623, 629 (Tex. 2002). An expert's opinion might be unreliable, for example, if it is based on assumed facts that vary from the actual facts, *Burroughs Wellcome Co. v. Crye*, 907 S.W.2d 497, 499 (Tex. 1995), or it might be conclusory because it is based on tests or data that do not support the conclusions reached. *City of San Antonio v. Pollock*, 284 S.W.3d 809, 818 (Tex. 2009). In either instance, the opinion is not probative evidence.

Further, each material part of an expert's theory must be reliable. For example, the issue in *Volkswagen of America, Inc. v. Ramirez*, 159 S.W.3d 897, 902 (Tex. 2004), was whether a wheel that separated from a car's axle was the cause or the result of an accident. An expert testified that a bearing defect in the wheel assembly caused the wheel to separate from the axle. *Id.* at 904. Tests conducted by the experts related to how the bearing failed, but the expert did not explain how the wheel remained in the wheel well as the car crossed a median, collided with another car, and spun around. *Id.* at 905-06. The tests did not support the expert's opinion that the wheel remained with the car for an extended period despite the bearing's failure having caused the wheel to separate from the axle early in the accident sequence. *Id.*; see also *Cooper Tire & Rubber Co. v. Mendez*, 204 S.W.3d 797, 805 (Tex. 2006) (noting that an expert who testified a tire was defective when it left the manufacturing plant offered no theory regarding how the tire could be used for 30,000 miles and suffer a nail puncture without failing). We determined that the expert's opinion was unreliable because the expert failed to explain how the wheel remained in the wheel well throughout the accident sequence. *Volkswagen*, 159 S.W.3d at 906.

B. Standard of Review

Generally, rulings on objections as to admissibility of evidence, including whether expert testimony is reliable, are reviewed for abuse of discretion. *Helena Chem. Co. v. Wilkins*, 47 S.W.3d 486, 499 (Tex. 2001). But a party may assert on appeal that unreliable scientific evidence or expert testimony is not only inadmissible, but also that its unreliability makes it legally insufficient to support a verdict. *See Volkswagen*, 159 S.W.3d at 903.

Unlike review of a trial court's ruling as to admissibility of evidence where the ruling is reviewed for abuse of discretion, in a no-evidence review we independently consider whether the evidence at trial would enable reasonable and fair-minded jurors to reach the verdict. *City of Keller v. Wilson*, 168 S.W.3d 802, 827 (Tex. 2005). Further, a no-evidence review encompasses the entire record, including contrary evidence tending to show the expert opinion is incompetent or unreliable. *Id.* at 814.

In determining whether expert testimony is reliable, a court may consider the factors set out by the Court in *Robinson*⁶ and the expert's experience. *See Gammill v. Jack Williams Chevrolet, Inc.*, 972 S.W.2d 713, 724 (Tex. 1998). However, in very few cases will the evidence be such that the trial court's reliability determination can properly be based only on the experience of a qualified expert to the exclusion of factors such as those set out in *Robinson*, or, on the other hand, properly be based only on factors such as those set out in *Robinson* to the exclusion of considerations based

⁶ *Robinson* set out the following list of nonexclusive factors: (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 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. *Robinson*, 923 S.W.2d at 557.

on a qualified expert's experience. *See Mack Trucks*, 206 S.W.3d at 579 (noting that the criteria to be used to evaluate the reliability of expert testimony depends on the nature of the evidence); *Gammill*, 972 S.W.2d at 726.

C. The Court of Appeals' Review

The court of appeals noted that Whirlpool challenged the legal sufficiency of the evidence as to design defect and that Whirlpool's argument, in part, was that the Camachos' expert testimony was not relevant and reliable. 251 S.W.3d at 95-96. The court then concluded, however, that Whirlpool's first three issues—challenges to relevance and reliability of evidence as to design defect, admissibility of a Consumer Product Safety Commission (CPSC) report, and admissibility of an exemplar dryer—dealt with admissibility of evidence and reviewed those issues accordingly. *Id.* at 96. It then determined that “the analytical gap test is the appropriate way to analyze the Camachos' expert testimony because such testimony in the instant case is based on the experience of the testifying experts.” *Id.* The court held that the trial court did not abuse its discretion in admitting Clayton's testimony. *Id.* at 98-100. The appeals court then considered Whirlpool's contention that it conclusively disproved the validity of Clayton's opinions for legal sufficiency, but did not otherwise review Whirlpool's challenge to the design defect evidence for legal sufficiency. *Id.* at 100; *see City of Keller*, 168 S.W.3d at 827 (noting that a legal sufficiency issue will be sustained if the record reveals one of the following: (1) the complete absence of a vital fact, (2) the court is barred by rules of law or of evidence from giving weight to the only evidence offered to prove a vital fact, (3) the evidence offered to prove a vital fact is no more than a scintilla, or (4) the evidence established conclusively the opposite of the vital fact).

We disagree with the Camachos' assertion that the court of appeals effectively performed a proper legal sufficiency review by determining whether Whirlpool conclusively disproved that the fire occurred as Clayton testified it did. Evaluating whether expert testimony has been conclusively disproved by the opposing party is not the same as considering whether the proponent of the testimony satisfied its burden to prove the testimony is relevant and reliable. *See Mack Trucks*, 206 S.W.3d at 578; *Volkswagen*, 159 S.W.3d at 904; *Robinson*, 923 S.W.2d at 557. The proponent must satisfy its burden regardless of the quality or quantity of the opposing party's evidence on the issue and regardless of whether the opposing party attempts to conclusively prove the expert testimony is wrong.

Witnesses offered as experts in an area or subject will invariably have experience in that field. If courts merely accept "experience" as a substitute for proof that an expert's opinions are reliable and then only examine the testimony for analytical gaps in the expert's logic and opinions, an expert can effectively insulate his or her conclusions from meaningful review by filling gaps in the testimony with almost any type of data or subjective opinions. *See Gammill*, 972 S.W.2d at 722. We have recognized, and do recognize, that some subjects do not lend themselves to scientific testing and scientific methodology. *Id.* at 724; *see Ford Motor Co. v. Ledesma*, 242 S.W.3d 32, 39 (Tex. 2007) (recognizing that the *Robinson* factors do not readily lend themselves to a review of expert testimony in automobile accident cases). But given the facts in this case, the analytical gap test was not the only factor that should have been considered. For example, although Clayton had extensive experience in fire investigation and testified that he relied on that experience in reaching his opinions, much of the evidence offered by both parties centered on testing: lint ignition tests,

reports of dryer tests by the CPSC, and tests Whirlpool performed on clothes dryers. That evidence corresponds to the first reliability factor discussed in *Robinson*—the extent to which a theory and its parts have been or could be subject to testing. *See Robinson*, 923 S.W.2d at 557. Further, Clayton testified that some of his opinions were peer reviewed—another factor we listed in *Robinson*. *See id.* This is not one of the few cases in which appellate review of expert evidence should be limited to either an analysis focused solely on *Robinson*-like factors or solely on an analytical gap test. We agree with Whirlpool that proper appellate legal sufficiency review pursuant to Whirlpool’s challenge requires evaluating Clayton’s testimony by considering both *Robinson*-type factors and examining for analytical gaps in his testimony.

III. Application

The lint transport tube and blower assembly on the Camachos’ dryer were destroyed in the fire, so there was no evidence of the condition of the transport tube. Clayton testified that according to general engineering knowledge, corrugated tubing could cause lint to hang up inside the tube. He examined the transport tube of an exemplar dryer that had a great deal of lint in it, but he did not contend the tube from the exemplar dryer reflected the condition of the tube on the Camachos’ dryer. Rightfully so. The former owner of the exemplar dryer testified that the exemplar did not have its exhaust vent properly connected during the first of the four years she owned and used it. She also testified that she typically used the dryer two to three days each week, and when she used it, she usually dried eight to ten loads of clothes. In contrast, the Camachos used their dryer twice a week to dry a few of the boys’ tee-shirts, and the exhaust air from their dryer was always properly vented to the outside of the trailer. There was no evidence that before the Camachos purchased the dryer

from their daughter, it was used in a manner similar to the exemplar. Further, there was evidence that the dryer had been serviced shortly before the Camachos purchased it and the cabinet had been vacuumed out.

Clayton had not seen or read of a test showing that a corrugated lint transport tube in a dryer properly vented, such as the Camachos' was, would become clogged with lint to the extent it backed lint up in the blower assembly. He did not personally test his theory. Nor did he test his theory that lint would be blown through the lint chute seal if the lint transport tube became clogged. Nevertheless, he offered the opinion that the corrugated lint tube in the Camachos' dryer became clogged and the clogging caused excessive lint to be blown into the dryer cabinet through the lint chute seal.

Building on his opinion that the corrugated lint transport tube caused excessive lint to be blown through the lint chute seal, Clayton asserted that some of the lint particles remained airborne and were drawn into the heater box where they ignited and were circulated to the dryer drum inlet grill. There the lint either passed through the approximately one-quarter inch openings in the grill and into the drum, or ignited more lint that was trapped on the grill, which in turn became "untrapped" and was circulated by airflow through the grill openings into the dryer drum. Clayton identified what he believed to be burnt lint on the heater element of the Camacho dryer, but he did not find any on the inlet grill or in the dryer drum.

Whirlpool challenges Clayton's assertion based, in part, on its contention that uncontested expert testimony and test results showed that even if lint particles had been ignited by the heating element or if lint trapped on the inlet grill was ignited by particles previously ignited by the heating

element, any particles small enough to pass through the small openings in the inlet grill would not have ignited clothing in the drum. Whirlpool relies on evidence and testimony that (1) the particles would not have generated enough heat to ignite the drying clothes, (2) the particles would not have remained smoldering but would have quickly self-extinguished, and (3) even if they had not self-extinguished, the tumbling, drying clothes and circulating air in the drum would have extinguished them.

Clayton based his opinion that the ignited lint survived to ignite the clothing in the dryer, in part, on lint-ignition tests described in a CPSC report entitled “Final Report on Electric Clothes Dryers and Lint Ignition Characteristics.”⁷ The CPSC report documented tests showing lint being ignited by a horizontally-mounted heating element, being carried “downstream” from the heating element by air flow, and then igniting other lint and cloth. The lint ignited by the heating element was carried by airflow in a straight line directly onto open, fixed pieces of lint and cloth that were secured in place. Unlike the manner in which the Easy Clean 100 was designed and operated, the target lint and cloth in the CPSC test were not separated from the heating element by an inlet grill nor were they tumbling with air circulating through them as clothes in the Camachos’ dryer would have been.

In addition to the configuration and operation of the test equipment in the CPSC test differing significantly from the way the Easy Clean 100 dryer was configured and operated, the pieces of lint

⁷ In his testimony, Clayton also discussed a test performed by Dr. Don Russell, another expert hired by the Camachos. In that test, tufts of lint ignited when they were dropped directly onto an energized heating element. Clayton did not assert that this test supported his conclusion that ignited lint would survive to ignite clothing in a dryer. He stated that this test showed what happened when lint came in contact with an energized heating element. He acknowledged that tufts of lint the size used in the test were too large to become airborne and be drawn into the heating element.

tested by the CPSC were larger and heavier than any pieces of lint that evidence showed (1) would have been in the dryer cabinet to begin with or (2) could have been airborne or pulled by the dryer's airflow from the cabinet base into the heater box. In the CPSC test, the lint pieces weighed .10, .20, and .30 grams. The Camachos presented no evidence that pieces of lint weighing that much were probably present in the cabinet of their dryer, while Whirlpool introduced evidence of tests and expert testimony to the effect that the largest piece of lint that could pass through the Easy Clean 100's inlet grill was .0051 grams—a much smaller piece of lint than those used by the CPSC testers. The CPSC did not report testing or calculation of whether lint pieces of the size they used for testing would in some manner either remain airborne and be drawn into the dryer's heater box, or whether they could be drawn into the heater box from a resting place on the floor of the cabinet beneath the heater box. Whirlpool's evidence, however, included tests showing that tufts of lint similar in size to the lint pieces used in the CPSC tests would not become airborne inside the dryer cabinet and would not be drawn up into the heater box even when positioned on the cabinet base directly underneath the heater box.

Whirlpool also introduced evidence that lint pieces small enough to pass through the dryer drum's inlet grill self-extinguish within one or two seconds and are not capable of generating sufficient heat energy to ignite clothing such as tee-shirts. And a Whirlpool expert testified that even if a smoldering piece of lint could find its way into the dryer drum and tumbling clothes, the ignited lint would not be “captured” by the clothing in the dryer and remain smoldering undetected until the dryer door was opened by someone such as Margarita. Instead, the tumbling clothing would have

a “stop drop and roll” effect on the smoldering lint and extinguish it, just as fire is extinguished when persons whose clothing has caught fire are rolled on the ground.

While we do not decide whether Whirlpool’s evidence conclusively proved that Clayton’s opinions were invalid, we note that the evidence, including the CPSC report relied on by Clayton, highlights the extent to which Clayton’s theory was subject to testing and examining for reliability. Clayton did not explain what size particles of lint he believed could have remained airborne and then been drawn into the heater box. He did not test or otherwise calculate or determine the maximum size or weight of lint particles that could be drawn into the heater box by the Easy Clean 100’s air circulation system. He did not determine and did not know the length of time it took for various sizes of ignited lint particles to self-extinguish or how much heat was generated by ignited lint particles. Clayton neither performed tests, had tests performed, did calculations to determine, or testified about (1) the size of lint particles that could be blown through the lint chute seal into and remain airborne in the dryer cabinet; (2) whether lint particles that were ignited and were small enough to pass through the inlet grill’s approximately one-quarter inch openings into the dryer drum were capable of remaining lit for more than a few seconds or producing sufficient heat to ignite clothes in the dryer drum; or (3) how ignited lint particles small enough to pass through the inlet grill could survive and smolder inside a tumbling clothes load through at least part of a drying cycle. He denied having seen “any testing anywhere that found that a smoldering piece of lint can have a sufficient heat release, both in terms of temperature and longevity, to cause a tumbling drum load to itself reach smoldering temperatures.”

While Clayton referenced the CPSC report, he did not explain how the testing data supported his ultimate conclusion as to lint particles reaching the clothes in the drum, smoldering there for some period of time, and then igniting the clothes. Nor was there an explanation of how the CPSC test supported his conclusion that much smaller airborne lint particles could pass through an inlet grill into tumbling clothes and remain smoldering for at least a few minutes before igniting the clothes. Thus, the only test on which he founded his theory about how the fire was started in the dryer drum by ignited lint particles did not support all the various and critical parts of his opinion. *See Volkswagen*, 159 S.W.3d at 906 (pointing out that while an expert conducted tests related to one aspect of his theory, he never explained how those tests supported another aspect of his opinion).

It is incumbent on an expert to connect the data relied on and his or her opinion and to show how that data is valid support for the opinion reached. *See Pollock*, 284 S.W.3d at 819-20; *Volkswagen*, 159 S.W.3d at 906; *Gammill*, 972 S.W.2d at 726. Clayton did not do so.

The Camachos assert that because there was legally sufficient evidence that the fire began in the dryer and there was testimony that other possible causes of the fire had been eliminated, testing was not *required* to prove that material in the drum could be ignited in the manner advanced by Clayton. Testing is not always required to support an expert's opinion, but lack of relevant testing to the extent it was possible, either by the expert or others, is one factor that points toward a determination that an expert opinion is unreliable. *See Volkswagen*, 159 S.W.3d at 906 (“[E]ven more concerning in light of our jurisprudence is that [the expert] performed no tests and cited no publications to support his opinion”); *see also Mack Trucks*, 206 S.W.3d at 580; *Cooper Tire*, 204 S.W.3d at 802. If testing of critical aspects of an expert's testimony has not taken place either

by the expert or others in the relevant scientific or expert community, then an explanation of why it has not is an important consideration in evaluating the expert opinions and determining whether they are substantively more than merely the expert's conclusory, subjective opinion.

Aside from the lack of testing as to most of Clayton's theory of how the fire was caused by a clogged lint transport tube, the other *Robinson* factors do not help establish the reliability of Clayton's opinion. Clayton's theory was developed for the litigation in this case. *See Robinson*, 923 S.W.2d at 559 (“[O]pinions formed solely for the purpose of testifying are more likely to be biased toward a particular result.”). Also, his opinions and theory had not been published in any scientific journal, treatise, or publication so they could be subjected to peer review by someone other than an expert retained by the Camachos in regard to the lawsuit. The purpose of publication and peer review is to allow the relevant community to comment on the expert's theories, findings, and conclusions. *See Havner*, 953 S.W.2d at 727. That did not occur here. Further, Clayton did not indicate that his theory had been accepted as valid by any part of a relevant scientific or expert community at large.

The Camachos point to objective evidence they say supports Clayton's opinion that the fire was started by lint embers that reached, then survived among, and ignited the clothes in the dryer: partially charred tee-shirts inside the dryer, an investigator's report noting severe damage to the interior of the dryer drum, testimony that damage to the laundry room indicated the fire could not have started beneath the floor, and Margarita's testimony that she saw fire coming from the drum of the dryer. But these facts are consistent with and support a conclusion that fire was in and around the dryer, not that the fire originated as Clayton said it did. *See Mack Trucks*, 206 S.W.3d at 580

(noting that factors relied on by an expert consistent with the release of diesel fuel prior to a fire were not probative evidence that diesel fuel was released because of an asserted defect in the fuel system).

When all the evidence is considered, as it must be in a proper legal sufficiency review, we conclude that the data on which Clayton relied does not support his opinions. His opinions are subjective, conclusory, and are not entitled to probative weight. *Pollock*, 284 S.W.3d at 817. Because his testimony is the only evidence that the alleged design defect—a corrugated lint transport tube—caused the fire, there is no evidence to support the finding that a design defect in the dryer caused the trailer fire.

Because Whirlpool’s challenge to the legal sufficiency of the evidence of design defect is dispositive, we do not reach the remainder of its issues.

IV. Conclusion

The evidence is legally insufficient to support the jury’s verdict. We reverse the court of appeals’ judgment and render judgment that the Camachos take nothing.

Phil Johnson
Justice

OPINION DELIVERED: December 11, 2009

APPENDIX A

