Only 3 things that can cause a misfire? I don't think so.

It has always concerned me when in classes on vehicle computer control, the instructor would say: "Remember techs, you must first diagnose any computer control vehicle as if it did not have a computer. You must "check the basics" first. Yet, part of checking the basics was never anything dealing with *shared current paths.*

I was in a class run by a national training company and the instructor showed a slide related to what can cause a misfire. He then stated that there are only 3 things that can cause a misfire - Ignition, air/fuel, and mechanical. I think that training company missed something. There are 4 things - the one they missed is "significant resistance in a shared current path".

The following statement comes from the Fluke library:

One of the most rampant electrical maladies showing up in automotive service bays today is the phenomenon known as voltage drop. Left unchecked, voltage drop causes countless unsolved electrical mysteries, especially when it infects the ground side of a circuit. It can also trick you into replacing parts that are not bad. The more connections and wiring a vehicle has the more vulnerable the electrical system is to voltage drop. …Fluke Corporation P.O. Box 9090, Everett, WA 98260 Used with permission from Fluke.

I think that what the writer really meant in this statement where it says: " …especially when it infects the ground side of a circuit", was " …especially when it infects the *shared current paths on the ground side".*

Excessive resistance in a shared current can lower voltage, which lowers amperage to whatever components are sharing the same current path.

Shared Current Paths

Part of every vehicle's electrical system includes voltage feed current paths from the battery positive (+) terminal to the input pin of all loads, and ground return current paths from the output pin of all loads back to the battery negative (-) terminal.

Some of the vehicle's wires, sheet metal, frame, and the engine block are part of a system of "shared current paths." These parts can carry *all* the current being used by all of the loads operating at any one time.

I have applied the term "shared current paths" to those sections of wires and ground return sheet and frame or engine block metal where current from more than one component passes through either on the voltage feed side or on the ground return side of any circuit.

The following items are part of the shared current paths in any vehicle:

Battery cell plate material.
Battery positive (+) and negative (-) terminals.
Any battery positive (+) cable, cable connectors, and connections. This could include: a battery positive (+) pigtail connected to:

- **a junction block**
- **a fuse block**
- **a BEC (Bussed Electrical Connector)**
- **fusible links or maxi fuses.**

Battery negative (-) cables, cable connectors, and connections. These could include:
Straps, ground wires, cables, cable connectors, and connections that are attached:

- **directly to the battery,**
- **between any sheet metal and the block.**
- **between any frame member and the block.**
- **between any sheet metal to any other sheet metal anywhere on the vehicle.**

All frame to frame, sheet metal to frame, and sheet metal to sheet metal c connections. Welds, rivets, bolts, etc.

Generator: The wire, wire connector, and connections between the battery positive (+) terminal and the B+ stud on the alternator.
The physical connection where the generator clamps to the block.
Starter motor: When the battery negative cable is connected to the starter motor housing. The physical connection between the starter motor and where is connects to the block.

About "shared current paths".
It is smart troubleshooting to do a complete shared current path base system tests on *every* vehicle exhibiting drive ability symptoms that cannot be pinpointed with scan testing and code retrieval.

If a part, or a connection between the parts, of the base system is not performing as engineered, sometimes the results can be as severe as a no crank-no start, or rather subtle.

A base system that has lost its design integrity has been known to cause: drivability problems; intermittent electrical / electronic, including digital dash, problems; engine idling (no load) and running (load) problems; flickering lights; and other problems.

You need to verify a sound base system and all of its conductors, connectors, connections, and contacts *before* you attempt to fix anything.

An increase in current flow across a base system shared-ground connection can cause a voltage drop at a point in the ground return that could result in voltage being reduced or denied to some component *totally unrelated* to the load that is seeking ground.

If a particular splice, connection, or section of the wiring in the base-system shared-ground return developed excessive resistance, the current has many other paths, not contained-in-wire, where it can seek its ground back to the battery's negative (-) terminal. This current can play havoc in an electrical or electronic system when it seeks ground through a path that was not engineered for its use.

If you jump into testing an individual circuit before testing the base system, you may never find what could have been the cause of the complaint, because the symptom may be due to a problem in the base-system shared-voltage feed or ground return current paths.

Without verifying the base system *first,* you could spend a lot of time troubleshooting an individual circuit, looking for something that is not there, changing parts, and fixing nothing.

If you skip base-system testing and go right on to individual circuit testing, some voltage drops that cause symptoms of complaint may *never* be found.

Individual circuit testing should never be performed until *after* all base-system testing has been completed, and all excessive voltage drops in the base system have been reduced to an acceptable standard.

When you are confident that the base system is working as engineered, and that *all* of its conductors, connectors, connections, and contacts have acceptable voltage drops; then, and only then, should you continue with *any diagnosis of any individual circuit.*

You will find, in some cases, that after testing and repairing the base system, the problem that the vehicle came in with will have been repaired.

Shared current path testing is smart troubleshooting.

My book *"Understanding and Troubleshooting Vehicle Voltage Drop"* covers shared current paths and shared current path testing.
See "Shopping Cart" if interested.

www.Vestest.com The Vehicle Voltage Drop Website