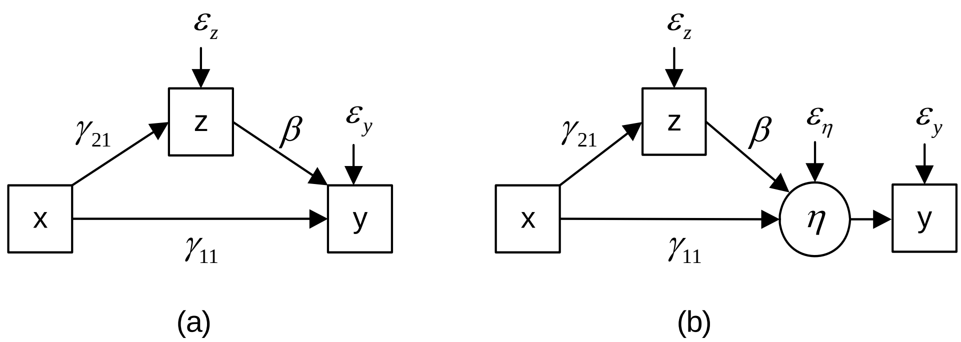

Figure 4.2. Path diagrams for a mediational process with a single predictor, mediator and observed response in (a) and latent response in (b).

mediation model is given by

$$y = \gamma_{10} + \gamma_{11}x + \beta z + \epsilon_y, \quad z = \gamma_{20} + \gamma_{21}x + \epsilon_z \tag{4.117}$$
$$E(\epsilon_y) = 0, \quad Cov(x, \epsilon_y) = 0, \quad Cov(z, \epsilon_y) = 0$$
$$E(\epsilon_z) = 0, \quad Cov(x, \epsilon_z) = 0$$

In the above, x is called an *exogenous* variable, while z and y are called *endogenous* variables, as the latter two are determined by other variables within this SEM. As a special case, if $\gamma_{11} = 0$, (4.117) yields a *full* mediational process with no residual direct effect of x on y.

Note that in the nomenclature of regression, y is a response variable for the first and z a response variable for the second model equations in (4.117). However, such terms do not apply to SEM since a variable can serve as both a dependent and independent variable, such as z in (4.117).

Since a primary goal of SEM is to make causal inference, stochastic independence is not taken for granted. The usual independence assumption is replaced by zero correlation (or covariance), which unlike independence can be empirically checked and validated. For example, to assess the causal effect of x and z in (4.117), it is critical that neither be correlated with ϵ_y in the first equation and that x not be correlated with ϵ_z in the second equation. Such a zero-correlation assumption is known as *pseudo-isolation* in SEM.

Example 2 (*SEM for mediational process with latent response*). Similarly, by using the path diagram in Figure 4.2 (b) as a guide, we can express the SEM for the mediational process involving a latent *endogenous*